NATIONAL CAR BUILDER

VOLUME XI.
NUMBER 6.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

$1.00 PER ANNUM.
SINGLE NUMBERS, TEN CENTS.

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JUNE, 1880.

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150 Madison Street.

RAILWAY PUBLICATIONS.

The following publications will be mailed on receipt of price by the NATIONAL CAR-BUILDER:

BOOKS.

Catechism of the Locomotive (Forney)	$2.50
Location of Railways (Wellington)	2.00
Roadmaster's Assistant (Huntington & Latimer)	1.50
Railway Revenue (Kirkman)	2.50
The Field Engineer (W. F. Shunk)	2.50
Railway Train and Station Service (Kirkman)	2.00
Railway Baggage Car Traffic (Kirkman)	2.00
Railway Builder (Nicholls)	2.00
Friction and Lubrication (Thurston)	1.50
Car-Builders' Dictionary	2.00

PAMPHLETS.

Cost of Passenger Traffic (Fink)	75 cts.
Cost of Railroad Transportation (Fink)	75 "
Railroad Employés in France (Jacqmin)	25 "
The Verrugas Viaduct (Pontzen)	40 "
Frog Angles and Distances (Gieseler)	25 "
Locomotives for Rapid Transit (Forney)	40 "
Standard and Narrow Gauge (Von Weber)	25 "
Railroad Local Passenger Traffic (F. J. Lee)	25 "

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MASTER CAR-BUILDERS' ASSOCIATION.

OFFICERS:

LEANDER GAREY, President, Grand Central Depot, N. Y.
M. P. FORD, Vice President, Columbus, Ohio.
B. K. VERBRYCK, Treasurer, Chicago, Ill.
C. A. SMITH, Secretary, 113 Liberty street, N. Y.
Association Rooms, 113 Liberty str et, N. Y.
Next Annual Meeting, at Detroit, Mich., June 8, 1880.

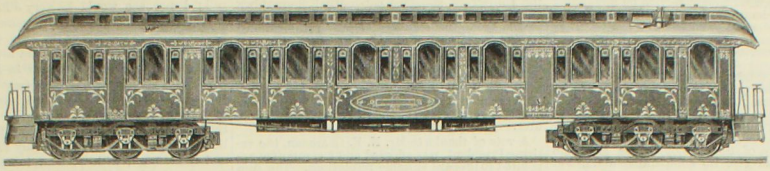
MASTER CAR-PAINTERS' ASSOCIATION OF THE UNITED STATES.

OFFICERS:

D. D. ROBERTSON, President, Detroit, Mich.
J. H. WILL, Vice-President, Morrisania, N. Y.
R. McKEON, Secretary and Treasurer, Kent, Ohio.
Next Annual Meeting at St. Louis, Mo., September 15, 1880.

NATIONAL CAR-BUILDER DIRECTORY.

THE NATIONAL CAR-BUILDER.



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Master Mechanics' Association.

This Association held its thirteenth annual convention, at Cleveland, Ohio, commencing May 11. There were about forty members present at the calling of the roll. The following new members joined the association by signing the constitution:

Robert B. Small, International & Great Northern.
B. J. Sitton, Selma, Rome & Dalton.
Wm. Swanston, Jeffersonville, Madison and Indianapolis.
Geo. C. Watrous, Delaware, Lackawanna & Western.
Thos. B. Twombly, Chicago, Rock Island & Pacific.
A. R. McAlpine, Cleveland, Columbus, Cincinnati & Indianopolis.
W. Spittle, Valley, of Ohio.
Chas. T. Parry, Baldwin Locomotive Works.
H. D. Gordon, Philadelphia, Wilmington & Baltimore.

Mr. N. E. Chapman, the President of the Association, then delivered his annual address, as follows:

FRIENDS AND FELLOW MEMBERS: It is a pleasure and privilege to meet you in this city, where, thirteen years ago, we held an initial meeting, with a membership of forty at our adjournment. At present we number 180. Many have joined our Association and served with us during their experience as master mechanics; many have left the ranks for other business; some have assumed the duties of higher positions; others, and I am happy to say the number is not great, have gone before us to the untried future. Most, if not all, have left a good record behind them. As the names of those who have left us voluntarily have been dropped from the roll their places have been taken by others, who, in many instances, filled the position on the road thus made vacant.

We feel justly, perhaps, that we have done some good to our profession. I, for one, must say I have been greatly benefited by my connection with the Association. The social features of our meetings are all very pleasant, and I think we are all benefited thereby. Speaking of the social features of our gatherings, I would like to remind our members that, although this is a great factor in the continued life and usefulness of our organization, still there is something else—for those of our members who are not so socially inclined as the rest of us it is the only point worthy of consideration. I mean the benefit to be gained to our profession through our organization. It has seemed to me that for the past few years there was not as much interest taken as there should be by a large portion, and, perhaps, a majority of our membership in both the beforementioned features, and, as a result, both classes of our members are getting to think that they are paying too dear for the benefit gained.

The point I wish to impress on you is this: We meet to benefit each other in our profession, and although through adverse circumstances we may not be able to carry out the improvements and changes suggested, yet we lose nothing by knowing of them. At our last meeting we were congratulating ourselves upon the prospect of better times, which then seemed at hand. They came more suddenly and generally than the most sanguine of us dared to hope, and as part of the better times came an increased price or value on every commodity. It became evident soon after the revival in trade commenced that iron was advancing far beyond its actual value, and was radically taking everything with it in its upward strides, that something must occur to cut off the purely speculative portion of the advanced prices to prevent as sudden and ruinous a collapse and panic as followed 1873.

With the enormously advanced speculative prices which prevailed in iron came the importation of such vast quantities as to seriously threaten the entire iron industry of this country, but just when the danger was the greatest the men of forethought and nerve, who should have controlled the iron market from the first, came to the front and cut off the speculative prices and restored the market to a firmer condition.

I trust they may not lose their grip. With the advance in iron and other commodities came the advance of wages to a large part of the laboring population, and in fulfillment of their promise of 1877 the majority of the railroads have now advanced or restored the rates to those of 1877 or previous to the last reduction. Let us hope the prosperous times may continue, which, with abundant crops the coming season, would be almost assured, and that labor and capital may work in unison.

The annual report of the Secretary stated that the number of members at the last meeting was 161; new members, 21. There had been during the year two deaths (John Minshull and J. B. Wilson) and one resignation, leaving the present membership 180. The total receipts of the year were $1562; balance on hand $641; the Boston fund with accrued interest now amounts to $3,853.31.

THE PREVENTION OF LOCOMOTIVE SMOKE.

The report of the committee on this subject contains the replies of several master mechanics to questions in reference to the kind of fire-boxes in use; the fire-brick arch or other modes of admitting air to the fire; the possibility of preventing smoke when bituminous coal is used, etc. Mr. N. E. Chapman, of the Cleveland & Pittsburg road, gets excellent results from the use of Smith's stack in connection with Clark's smoke consumer. Mr. Boon, of the Pittsburg, Ft. Wayne & Chicago, is very favorably impressed with the brick arch, especially with steel fire-boxes. Mr. Johann, of the Wabash, has abandoned the use of the arch and hollow stay-bolts to admit air above the fire. Mr. Purdy, of the Chicago, St. Louis & New Orleans, thinks the objections to air-openings, brick arches, etc., more than offset their advantages. Mr. Sedgley, of the Lake Shore, uses plain fire-boxes, and by repeated tests is convinced that there is no benefit in using the fire-brick arch. All of these gentlemen concur in the opinion that the essential thing in preventing smoke is good and intelligent firing, and that aside from this there is no method by which the smoke from bituminous coal can be very greatly diminished.

The committee are averse to laying down any definite rule as to the proportions of locomotive boilers, designed to burn bituminous coal, owing to the greatly varying heating qualities of such coals, and also of their evaporative capacities. The economical consumption of coal and prevention of smoke necessarily go together. Where everything solid or gaseous contained in the coal is consumed, the emission of smoke is reduced to a minimum.

The less the heating capacity of coal, the greater should be the area of the heating surfaces in the boiler. Where there is insufficient heating surface a forced combustion is necessary, or where the heating capacity of the coal is small, the boiler must be forced beyond its legitimate capacity, unless the grate area and heating surface are proportioned to suit the poor quality of coal.

It is a strong though safe assertion, that there has not been built a locomotive boiler *of sufficient capacity* to insure proper combustion of fuel. Size, weight and form are arbitrarily limited and bounded by the substructure and track on which the motive-power moves. With an ordinarily proportioned locomotive engine, taxed to the greatest capacity, only three-fourths as much water can be evaporated per pound of coal as with a well-proportioned stationary boiler having a good natural draft and proper area of grate for the quality of fuel used. Irregular and careless firing serves to aggravate the evils attendant on the forced combustion necessary in locomotives, and results not only in a waste of fuel, but also in the emission of volumes of black smoke.

Your Committee urge that locomotive boilers be constructed of the largest possible capacity consistent with a proper and safe weight upon the rails. This is the first and most important element in the prevention of smoke, with due economy in the consumption of fuel.

Next in importance is careful firing. Locomotive engineers and firemen must be educated to a higher standard in this regard. As the amount of steam used varies with the loads hauled, the grades climbed or descended, and the speed attained, so also must the amount of coal consumed vary, and locomotive engineers and firemen should be required to feed fuel to the boiler in proportion to the work being performed. It is a common practice for firemen to throw a large amount of coal into the furnace at one firing. That which is on top is rapidly coked by the heat underneath, and the gases generated escape unconsumed. An equal amount of coal placed in the furnace in three or four firings, at intervals of from three to five or six minutes, would in many instances evaporate twice as much water as when used in the careless manner designated, and the smoke emitted would be practically unobjectionable to the traveling public or the citizens of the various towns and villages through which our railroads run.

The admission of air above the fire is of material advantage in well-proportioned boilers, as it affords better combustion of the gases generated in the furnace and lessens the amount of smoke. An arbitrary rule, fixing the amount of air which should be thus admitted, cannot be followed. The admission of cold air above the fire impairs the steaming powers of boilers, the capacity of which is small in proportion to the size of the cylinders. Where boilers have large capacity, and combustion is not forced, the admission of air through tubes or hollow stay-bolts, or by any other practicable means, is beneficial. The amount so admitted should vary with the quality of the fuel used. Coals which permit the rapid generation of gases should have a larger quantity of air than those from which gases are not so readily thrown off.

It is evident that where a well-proportioned boiler is taxed to its full capacity, more air is required above the fire than where it is worked to one-fourth or one-half its capacity. It is, therefore, seen that when arrangements are made to admit air, means should be provided for regulating the amount in proportion to the work done and coal consumed. Careless firing will defeat all efforts which are made toward economical consumption of coal and prevention of smoke. Large boilers, admission of air and the use of good coal will not reach the object sought if careless firing be permitted.

The money expended by railway companies in experiments with water tables, fire-brick arches, peculiar-shaped furnaces, brick walls and midfeathers, has doubtless proved *what ought not to be done.* Your committee venture the opinion that the same amount of money would have been expended to better advantage had it been used in teaching men how to fire locomotive engines. Large boilers and fire-boxes, and careful firing are the "Best Means of Preventing Smoke from Locomotives With due Economy in Fuel."

COMPARATIVE PERFORMANCE OF LOCOMOTIVES.

The committee on this subject made a report, referring at the outset to a circular which had been issued by the committee asking for information with respect to the class of engines best adapted to heavy freight service. To this circular eight replies were received, but containing very little data that would enable the committee to make a full and satisfactory report. Most of the replies are from members who are using the American eight-wheeled engine.

Mr. N. E. Chapman, of the Cleveland & Pittsburg road, uses eight-wheel engines almost entirely, having but five ten-wheel ones, and these not being in regular service. He states that there is no doubt in his mind but that the mogul and consolidation classes of engines are the best for freight service when the speed does not exceed twelve miles an hour. For a higher rate of speed the eight-wheel engine would be more economical.

Mr. G. Coolidge, of the Fitchburg road says that for heavy freight service on steep grades he considers the consolidation class of locomotives the

best, and for general freight service on undulating roads with moderate grades, he prefers the mogul class to the American or eight-wheel engine. They have in use on his road four consolidation and fifteen mogul engines. No data received of work performed or cost of doing the same.

Mr. James Sedgley, of the Lake Shore road, furnished a statement of the performance of seven mogul and seven American eight-wheel engines, with reference to amount of fuel consumed, the result showing a difference of 2.2 per cent in favor of the moguls.

Mr. L. Finlay, of the St. Louis, Iron Mountain & Southern, can give no comparative data, but considers the ten-wheel engines the best for heavy freight service, all things considered.

A statement was received of the performance of the consolidation engine known as "Uncle Dick," working on a mountain grade of 184 feet to the mile on the southern extension of the Atchison, Topeka & Santa Fe road, in which 258 tons, exclusive of weight of engine, were hauled on the above grade at a speed of 8 miles an hour. The total weight of engine in working order, including water in tank, was 115,000 lbs.

Mr. Wm. Woodcock, of the Central of New Jersey, furnished a statement of the performance of a consolidation engine on that road, showing a total mileage during the past year of 40,025 miles. He also states that they have just received and put into service, eight new consolidation engines, cylinders 20 by 24 in., to be run in the same service as the former engines and thus far they are pleased with the manner in which they perform their work.

The committee is of the opinion that the consolidation engine is destined to be the coming engine for heavy freight service. They have received a statement from the Baldwin Locomotive Works (where the first consolidation engine was built in 1866 and placed in service on the Lehigh Valley Railroad), giving the number of this class of engines built at their works in comparison with the ten-wheel and mogul engines from 1866 to 1879 inclusive, showing a very large percentage of increase in the number of mogul and consolidation patterns built within the past few years.

The committee concludes that for heavy freight service, with a speed not over 12 miles an hour, the consolidation class is best; and that for general freight service, with a speed not exceeding 15 miles an hour, the moguls will give very good results. For fast freight, where a speed of 20 miles an hour is sometimes necessary, the American eight-wheel engines are no doubt the most economical.

"STRAIGHT TOP" AND "WAGON TOP" BOILERS.

Mr. Jacob Johann, of the Wabash, St. Louis & Pacific, read an elaborate paper on the comparative merits of these two types of locomotive boilers, giving his preference for the former or "straight top," as being the cheapest and the strongest. He had built one of each pattern for the purpose of determining their comparative merits. A careful estimate of the cost of material and labor upon each, showed that the straight top cost $290 less than the wagon top, which difference is principally in the cost of material, some 2,000 lbs. less weight being required for the straight boiler, with or without flues, than for the wagon top. The straight boiler steams equally well, if not better, under all circumstances, notwithstanding it has much less heating surface; it also contains 236 gallons more water, which brings its total weight in working order to within 200 lbs. of the wagon top. When these boilers were first built a failure was predicted for the straight top, but the predictions were not confirmed by the results. The number of miles run per ton of coal by the two engines with these boilers, both in the same passenger service and hauling trains averaging ten cars each, from Oct. 1, 1879, to May 1, 1880, was 31.11 per ton by wagon top and 31.73 by straight top. This proves that where hard and muddy water is used, which easily forms scale, the boiler with the greatest water circulation and most open crown sheet is the most economical.

As to the question of material for boilers, he had used steel exclusively for the last five years with marked success, and considered it the best material, all things considered, for locomotive boilers, both for fire-box and shell.

The Committee on Shop Tools and Machinery submitted an interesting report, giving detailed descriptions of new machines and appliances possessing superior advantages for safety, speed and economy in performing work over those now in use. It was resolved that a committee of five be appointed to confer with a similar committee from the Master Car-Builders' Association, to consider the subject of standard car-journal, journal-box and pedestal, and report whether any change is desirable from the standard already recommended by that association.

Officers for the ensuing year were elected as follows: President, Jas. N. Lauder, Northern R. R. of New Hampshire; 1st Vice-President, Reuben Wells, Louisville & Nashville; 2d Vice-President, J. D. Barnett, Grand Trunk. J. H. Setchel was continued as Secretary, and S. J. Hayes as Treasurer.

A vote of thanks to Mr. N. E. Chapman, the retiring President, was adopted and a committee appointed to prepare suitable resolutions. The sum of $600 was voted to the Secretary for his services during the past year.

The following subjects were reported for next year's meeting:

1. Boiler construction and improvements.
2. Shop tools and machinery for manufacturing and repairing locomotives.
3. Best means of attaining a higher economy in the use of bituminous coal.
4. Best form of construction of locomotives for fast passenger service.

Adjourned to meet in Providence, R. I., on the second Tuesday in May, 1881.

Car-Lighting in Germany.

One of the subjects reported upon at the technical convention of the German Railroad Union in 1878 was the lighting of cars. Reports were asked from the several companies with regard to the improvements effected in the illumination of passenger-cars, particularly with gas, and the cost of applying, keeping in order and running the different systems. Forty-five reports were rendered. Six corporations, representing 17.7 per cent. of the passenger-coaches owned by the roads reporting, used gas, chiefly prepared on the Pintsch system; in one instance no other form of light was used on the road, and all expressed satisfaction and an intention to extend its use on account of the cleanliness, saving of labor and superiority of lighting power. Five roads employed stearine candles in closed lamps and 44.8 per cent. of the cars are lighted by oil lamps, the majority burning the commonest vegetable oil with Argand burners in the first and second-class carriages, and common flat wicks in the lower classes. Some of them employed lamps with the oil resevoir above the flame to prevent the oil getting too thick to burn in cold weather; the supply of oil carried is sufficient for a ten hours' journey. On three roads American mineral oil was used in closed lamps with much better effect. The cost of the different systems was as follows:

Gas on the Pintsch system.—Cost of generator, about $8,000; fitting five burners in first and second-class carriages, $176. Three burners in a third-class carriage $120; and two in a fourth-class carriage, $95; each burner consumes from 20-25 litres (a litre is about a cubic foot) of gas per hour, costing on an average one-half cent. The lighting power of one gas flame equals that of four stearine candles.

Candles.—Fittings for a four-coupé car with two lights in each coupé, $50; each candle burns about ten hours, the cost per lamp amounting to ⅗ of a cent per hour, or a little over 3 cents per hour for the car.

Oil.—Five lamps for each car cost $29; the cost of burning is a trifle less per lamp than that of candles, but the light is inferior.

A Railroad Yacht.

The St. Louis *Journal of Commerce* thus describes a small steam-car built by Mr. Jay Noble of that city, for the private use of the officers of the Blairstown Railroad Company, of N. J: "In exterior appearance it resembles a handsome, well-built street-car, with a headlight on the front end. The body of the car carrying the machinery and load is very low, being only four inches above the rail; hence she would be very difficult to turn over. Her engines are outside, connected at right angles direct to the hub of the 24-in. drivers. The cylinders are 4 in. × 6 in., and are handled by links and radius bar, as is usual in railroad practice. The valves are of the rotary type, but of special design by Mr. Noble, and have the faculty of cutting off very sharp. The boiler is of the vertical tubular type, with submerged flues. It is a little dinky for its duty, being only 28 in. diameter and 42 in. high, with 38 2-in. tubes, 12 in. long, the top tube sheet being submerged. The fire-box is 24 in. diameter and 18 in. high. A peculiar feature about the boiler is a chimney only 5 in. in diameter. She carries a horse-shoe water-tank in the rear end, which also serves as seats for engineer and fireman. She has tankage for a 50-mile run and coal room for 100 miles. She will carry six persons comfortably in her forward cabin, which is handsomely upholstered. This car will run 50 miles per hour, as others of very similar construction by Mr. Noble have done. And now comes the funny part about the machine. In order to make this speed her 24 in. drivers, to which the engines are connected direct, must make 695 revolutions per minute, since her wheel covers 6.25 ft. each revolution, and her speed is .83 mile, or 4349 ft. per minute. Now, using as she does a mean effective pressure of 80 pounds to the square inch, carrying 125 pounds in her boiler, she would develop 21.15 horse-power per engine, or 42.30 horse-power per car. The interesting question is, where does this 42 horse-power of steam come from, when there is only a little pot of a boiler, with 22.07 square feet of heating surface, which, according to usual rating for vertical tubular boilers, allowing 15 square feet to the horse-power, would be only 2.14 horse-power? By these results the average steam theorist is badly upset. Here is a boiler giving off a horse-power for each three-quarters of a square foot of heating surface.

THE Union Pacific shops, at Omaha, are engaged in building eight first-class passenger-cars for the main line. They will be finished in a style superior to that of any cars now on the road.

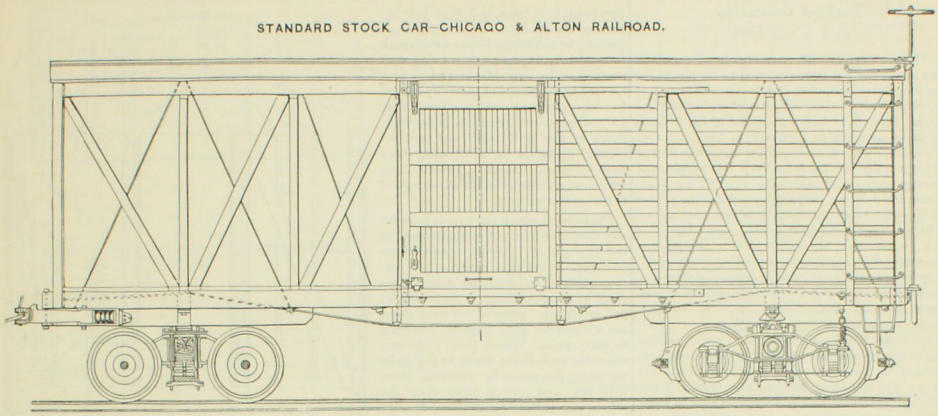
THE Car Accountants' Association at its recent meeting at Louisville, Ky., elected the following officers for the ensuing year: President, S. B. McConnico, New Orleans; Vice-President, F. M. Luce, Chicago; Assistant Secretary and Treasurer, W. E. Beecham, Milwaukee.

SUPERINTENDENT CLARKE, of the Union Division of the Union Pacific road, has issued a circular, saying that the practice of attaching hand or push cars to trains is one that has frequently resulted in injury to persons and damage to property, and must be entirely stopped. Employés in charge of such cars who permit them to be attached to trains will be dismissed from the company's service

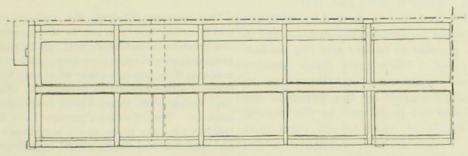
THE Pittsburg, Cincinnati & St. Louis have added 20 new passenger coaches to their equipment. They are finished in white walnut and basswood, Eastlake style. Fresh air is collected, and forced by the momentum of the car around the pipe and stove, and distributed from thence through the car by a flue.

THE sixth annual convention of the Yard-Masters' Mutual Benefit Association will be held at the Revere House, in Boston, Mass., on the 9th of June. A circular, issued by the president of the association, sets forth the importance of the meeting and the necessity of a large attendance in order to promote the objects for which it was organized. A cordial invitation is extended to yard-masters and railway officials generally, to be present at the meeting. A separate circular gives the total present membership at 333; the receipts up to April 30, 1880, $1,226.69; expenses, $995.05 balance in treasury, $231.64.

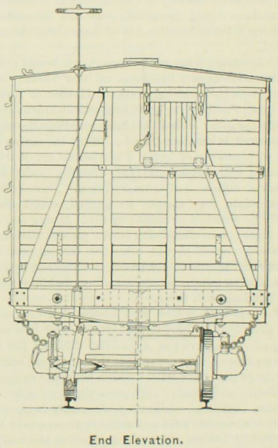
STANDARD STOCK CAR—CHICAGO & ALTON RAILROAD.



Side Elevation and Section.



Floor Frame.



End Elevation.

THE engravings show the style of construction of the standard stock-car of the Chicago & Alton Railroad Company. The principal specifications are as follows:

GENERAL DIMENSIONS.

Length of body, out to out of sills	30 ft. 6½ in.
Width " " "	9 " 0 "
Height, top of sill to top of plate	8 " 1 "
Side-door openings	4 " 9 "
End-door "	2 " 0 "

BODY TIMBERS.

2 center stringers, oak	4 × 7½ in. × 29 ft. 6½ in. between shoulders.
2 intermediate stringers, hard pine	3½ × 7½ in. × 29 ft. 6½ in. between shoulders.
2 side-sills, hard pine	4 × 7½ in. × 30 ft. 6½ in.
2 side-plates, "	3 × 5½ " × 30 " 11½ "
2 end-sills, oak	6 × 7½ " × 8 " 4 " between shoulders.
2 bumper arms, oak	4 × 7 in. × 7 ft. 11 in.
2 cross-ties, "	4 × 6½ " × 9 " 0 "
1 ridge-pole "	3 × 3 " × 30 " 2½ "
1 intermediate rib, oak	1¾ × 2 " × 30 " 2½ "
1 running-board, pine	15 in. × 30 ft. 8½ in.
Flooring, hard pine	1¾ " × 9 " 2 "
Roofing, soft pine	⅞ × 5½ in.
2 side-doors, oak	1¾ in. stuff.
2 end-doors, "	1¾ "
2 brake-beams, "	4½ × 6½ in. × 5 ft. 11 in.
2 dead-woods, "	4½ × 7½ " × 26½ in.
4 corner-posts, "	3¾ × 4¾ " × 7 ft. between shoulders.
4 door-posts, "	3¾ × 4½ in. × 7 ft. between shoulders.
14 intermediate posts, oak	2¼ × 3¾ in. × 7 ft. between shoulders, including cast-iron socket at each end.
9 carlines, oak	1¾ × 4½ in. in centre, tapered to 3 in. at each end.
2 end-plates, oak	2½ × 11¾ in. × 8 ft. 5½ in. between shoulders.
28 slats, oak	1 × 5½ in. × 12 ft. 5½ in. long on sides.
14 " "	1 × 5½ in. end slats.
16 " soft pine	⅞ × 5½ in. on side.
8 " "	⅞ × 5½ in. on end.
4 side-braces, oak	1½ × 4 in. × 8 ft. 3 in.
4 " "	1½ × 5 " × 7 " 10½ "
4 " "	1½ × 4 " × 7 " 10½ "
4 end-braces, "	1½ × 4 " × 7 " 8 "
2 swing-beams, "	9½ × 9½ × 5 " 6 "
2 spring-planks, "	2¾ × 9½ × 5 " 5 "

THE Garry Iron Roofing Company, Cleveland, has just shipped an order for its iron roofing to Jamaica, West Indies.

THE Baldwin Locomotive Works, Philadelphia, are at present employing over 2,700 men, and are running on over-time.

THE Indianapolis rolling-mill will in a few days commence on a contract to furnish 1,000 tons of rails, weighing 35 pounds to the yard, for the Danville, Olney & Ohio River narrow-gauge road.

AN order has been given by the Northern Pacific Railroad Company for the construction of fifteen new locomotives. The contract calls for the completion and delivery of several of these by July 1.

MR. A. L. DONALDSON has been appointed road-master of the Columbus & Toledo Railroad.

THE Russell Wheel and Foundry Co., of Detroit, Mich., has completed the enlargement to its works, which are now replete with every facility for the manufacture of car-wheels, heavy machinery, furnace castings, and general job-work. The orders on hand are fully equal to the capacity of the establishment for some time to come.

WELLS, FRENCH & CO., of Chicago, are employing 600 men and turning out twelve freight-cars a day. They have contracts on hand until August, and one also for completing about twenty spans of bridges for various roads.

THE Thielson Truck Company has granted a license to the Baldwin Locomotive Works to use its trucks on all the locomotives they build. These trucks have recently been supplied to 100 cars of the Flint & Pere Marquette road.

THE Chaplin Anti-Friction Car-box Company, of which John H. Mear is president, and which has a capital stock of $5,000,000, will build a factory at New Haven, if a suitable site can be found.

THE engine of the train which went down with the Tay Bridge has been raised, and the reversing-bar shows that the engineer had no time to reverse his engine before he went over. The recent evidence shows that the train and bridge fell together, and before the train left the track.

THE Michigan Central has a new 43-ton locomotive with 5½ feet drivers. It is expected to pull 20 passenger-cars or 55 freight-cars without difficulty.

THE Pullman Car-Works, in Detroit, are building 25 cars for the New York Metropolitan Elevated, and a number of parlor, sleeping, baggage, hotel, combination, and other cars for roads in various parts of the country, but principally at the west.

BLAINE BROTHERS, of Columbus, have leased the Cleveland, Mt. Vernon & Delaware shops at Mt. Vernon, O., for three years. They agree to do all repairs for the road at a fixed percentage over actual cost of labor and materials, and expect to turn out, in addition, four new box-cars a day.

THE HARLAN & HOLLINGSWORTH CO., in Wilmington, Del., lately shipped 14 passenger, 120 box and 50 flat cars to the Oregon Railway and Navigation Co.

Fire-Proof Construction.

BY W. E. PARTRIDGE.

Those who erect and have charge of car-shops are apt to pay but little attention to the means for making them fire-proof, this being considered as more properly the business of workers in stone and iron. There is, in fact, a good deal of indifference in the community in reference to fire-proof construction, owing to an imperfect understanding of what it really is. There are very few people even among professional architects who do not labor under the delusion that a fire-proof building must of necessity be an incombustible one, that is, one which is built of material which cannot burn. It is a curious fact, but one which is nevertheless true, that there are in most of our large cities buildings which are almost entirely composed of incombustible materials, and yet these same buildings could be easily destroyed by fire. On the other hand, there are fire-proof buildings into which wood enters largely as a material. These buildings are so nearly indestructible by fire that the contents of any one room might be consumed without in any way damaging the structure itself. A distinction, therefore, should always be kept in mind between what constitutes a fire-proof building and one composed entirely of incombustible materials. To make a thing fire-proof does not necessitate making it incombustible nor of incombustible material.

To illustrate what we have said, we would refer to two well-known buildings in New York. One of these is the printing-house of Harper & Bros., the other that of Gray's printing establishment near by the former. In both of these buildings the only woodwork is the floor boards. Even the sashes of the windows are of iron. Floor beams are of iron filled in with brick, and the dividing walls are either of hollow or of ordinary brick. These buildings, while they cannot be burned, could very easily be wrecked or ruined by fire. If any one of the large rooms containing books, papers, shelving or wooden cases should take fire, the supporting pillars and beams would be easily destroyed by the heat, and in falling would in all probability take the building with them.

The ease with which iron beams and columns are weakened by heat is well known, and it is not only an expensive but somewhat difficult job to protect them. As a contrast to this, there are many buildings that have only wooden beams to support the floors, and which would generally be considered wooden buildings, while they are really fire-proof to such an extent that any room in them could be completely burned out without injuring the building.

If we take a bar of wood 6 or 7 feet long, and as a matter of experiment cover it with sheet tin, we shall have protected it entirely from the action of fire for a long time. A beam thus covered may for experiment be loaded with a heavy weight and exposed to a brisk fire, when it will be found that if the tin thoroughly excludes the air the beam will resist the fire much longer than one of iron. If such a beam, placed upon suitable supports, instead of being covered with tin, is plastered with mortar, a very similar effect will be obtained. We do not know how long such a beam would stand an intense heat, but it would certainly do so for some hours. We have seen a single green board withstand perfectly the sharpest heat of a blacksmith's fire for twenty or thirty minutes without any protection whatever. Wood when protected from the action of the air is very little injured by heat. A small portion of the surface is at once converted by the heat into charcoal which is a very good non-conducter. This thin charcoal layer prevents the transmission of heat into the interior of the stick and leaves the wood unharmed, while a very small fire is sufficient to heat the flange of an iron beam to redness, and thus entirely destroy its strength. The wood must actually be consumed before its strength is materially injured. A wooden door covered on its two sides and edges with tin locked together and carefully nailed, has been found to resist fire better than an ordinary iron door. In mills where doors of this kind have been used for closing openings in party-walls, they have withstood fire more perfectly than iron ones, and have had the advantage of not transmitting heat.

The interest which these facts have for the car-builder is not perhaps seen at the first glance. A little consideration however, shows that many of our car-shops might be rendered almost fire-proof by an application of the principles just indicated. Many of our large shops are divided at quite frequent intervals by party-walls. Where these walls run above the roof, if the doors in the walls are made fire-proof by covering them with tin, and care is taken that the rafters and purlins do not cross so as to communicate the fire, any section might be burned out without damaging any other portion. Floor timbers and the under side of the roof may be sheeted up with tin. Old car-roofs might be used for the purpose, and in this way it is possible to render any one section entirely fire-proof. There are many smaller shops connected with car-works that may be made very nearly fire-proof by the judicious use of tin upon beams and posts, and by the careful plastering of woodwork where tin can not be used conveniently. Under such circumstances a fire would be confined to any one shop or room so long that there would be ample time for putting it out before it could spread to other buildings or break through the roof. It will be understood that it is not necessary to use new metal in any case for protecting the wood. In fact, any old sheet-metal will answer for the purpose, the only point being to secure it to the wood so that the heat will not cause it to drop off. Small nails will answer, and, where tin is used, it can be locked together and nailed also.

THE Toledo *Commercial* notices a fine dining-car, the first of four which the Barney & Smith M'f'g Co., of Dayton, are building for the Wabash, St. Louis & Pacific. The exterior is finished in Eastlake style. The main saloon is carpeted with a handsome body brussels. The tables, ten in number and with seating capacity of forty persons, are of solid black walnut. The seats are upholstered in Spanish leather, and have a very comfortable appearance. The head-lining is veneered work, very substantial in appearance and very elegant. Two attractive centre-pieces, models of art, are among the decorations of the interior. The dish closet is so arranged as to hold the dishes in their places, similar to arrangements for the same purpose on ship-board. Aside from this, at each table is a recess in the wall, to contain a castor and other table wares. The kitchen is one to delight the heart of the most fastidious cook. With its large Miller range, meat warmer, stationary dish-pan, water-coppers, coal receptacle, etc., there is nothing lacking. The cost of the car is in the neighborhood of $10,000.

A FOREIGN gentleman said to an employé of one of our railroads: "What is the next train to so and-so?" "No. 4, but she is late, because No. 15, which is just behind 11, is not going out before 17 backs up before 6. Then 29 will go out before your train gets in, to let 17 come up on the track where 8 is."

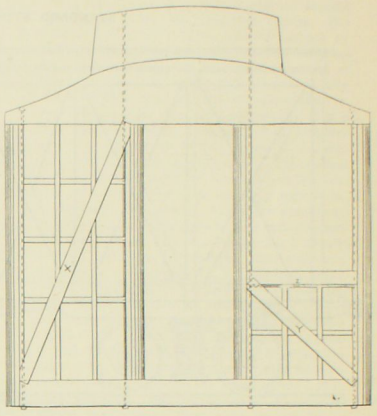


Fig. 4.

THE diagrams illustrate the methods of side-bracing and framing, mostly in use at the present time in the construction of passenger-cars. As to which is best, the great majority of experienced car-builders have doubtless made up their minds, so that what may be here said in favor of either method as against the others, will only have weight with those whose judgments are still in suspense. The views here presented are those of a car-builder, who has given much attention to the subject, and who has had many years' experience in the construction-shops of a prominent and well managed road.

Fig. 1 represents a method much used on old conservative roads that are a little behind the times. It is a very good one if there was nothing better. The great fault with it is, that it makes the frame too elastic. Cars built in this way have a camber of an inch or more between bolsters, for no other reason than to allow for depression when the supports are knocked out, the extent of such depression ranging from ¾ to ⅞ of an inch. This is all wrong. If the body truss-rods and side-bracing will not hold the car at the exact camber required, without a particle of deflection, the plan had better be changed for something that will do it; for any deflection that takes place when the car is put on the trucks, will be sure to increase as the car grows older. The brace straining-rods *b b* may be used to bring the car back to its camber, but every time this is done the car frame is also badly strained, causing open joints at *a a* by crowding the upper end of side body-braces *c* so hard against the window-post as to open the joint at belt-rail allowing water to get in; and when the car comes into the shop for repairs, the panels have to be torn off in order to replace the rotten parts and belt-rails. The style of brace-rod *A A* is much used by old car-builders; but the condition of cars with such rods, after they have run a year or two, is enough to condemn their use. The attention of a shop foreman was called to a car of this description which had come in for general repairs. The frame was not very straight longitudiually, there was a drooping at the end *B* and a corresponding rise at *C*. He could not account for this, saying he had tightened the brace and straining rods all they would bear; but when told that the plan of his brace-rods was the cause of the trouble, and that the weight of the ends at *B* was greater than the resistance at *C*, he said he had never thought of that, and admitted the correctness of the theory.

Fig. 2 represents a form of trussing or bracing in use on some roads. Like that shown in Fig. 1, it has some objectionable features. It strains the joints too much, and frequently leaves them open and causes the wood to rot. When the brace-rods *e e* are tightened up the strain is likely to be uneven, which racks the side-frame. The window sashes are sometimes difficult to raise, because the window posts are closer together at the lower than at the upper belt-rail, the posts near top end of brace-rods *D* having been forced out of place by

PASSENGER CAR FRAMING.

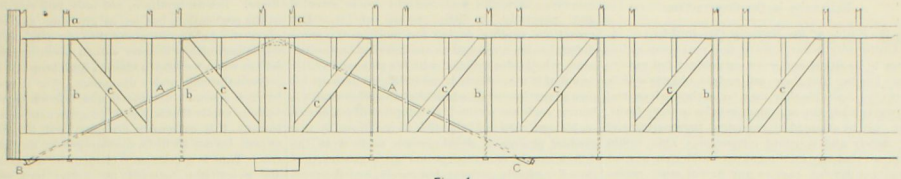


Fig. 1.

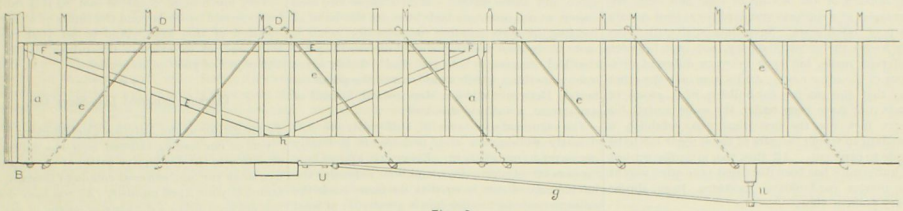


Fig. 2.

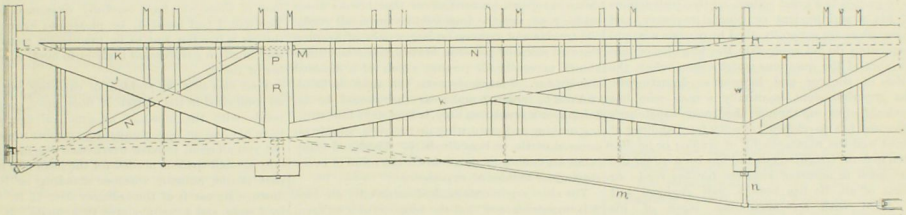


Fig. 3.

straining the rods. This style of framing, like the preceding, is also too elastic. There is nothing in it except the belt and panel rails to hold the car-body together in case the car turns over. The braces are of no use in such an emergency, and some car-builders do not use them at all, but put in two body truss-rods *g*, and depend on the turn-buckle to take up any deflection in centre of body. Others place outside face of posts ⅝ in. inside of side-sills, up as far as belt rail, and fill the space with longitudinal panels of same thickness, thoroughly glued and nailed to the posts. Upon these are then placed the outside panels. Such a car, however, is not likely to keep straight after four or six years service. Another plan in use on some western roads is to fasten boiler-plate to the posts, commencing near the end of car and extending it a short distance back of the bolsters. To be of any advantage, the plate should run the whole length of the car, and be bolted instead of screwed to the posts, otherwise it will soon begin to rattle. A short plate makes a weak point where it ends, but where the plate is continuous, this objection is obviated. Some builders put in angle brace-bars *E E* with foot *h* on side sills, made usually of ⅝ × 2½ in. iron, let in flush on inside of posts, and reaching each way an equal distance from the bolster to the points *F F*, where a hook-bolt running down through sill is fastened to them. This arrangement is supposed to hold the sill in line, at least from one hook-bolt to the other. The weak point, however, is the same as in Fig. 1, causing the car end to sag, with a corresponding rise back of bolster.

Fig. 3 is an improvement upon both the others, and if constructed properly, is the best style of framing that has yet been designed. The compression beam *J* and long brace *k* should join on post under belt-rail *H* and over cross-tie timbers. To keep the counter-braces from crowding corner-posts, a tie-rod *K* should be put in, running through all the posts from *L* to *M*. The longitudinal brace-bar *N* should be of ¾ × 2 in. iron, except where it goes through sill, where it may be 1 in. round, with nuts on ends to strain by. The brace-bar should have a bearing on a wrought-iron shoe *P*, let in on an oak strut or post *R*, which should rest on sill over bolster and fill space between window posts , and also be fastened to them with screws or bolts. There should be two body truss-rods *m* placed just inside of side-sills, and running through end-sills with 1¼ in. nuts on ends let into end-sills nearly flush, as shown in Fig. 3 at *T*, so the panel will cover it. The rods should pass over bolster as near the floor as possible, the higher the bearing point is at bolster and the lower it is at cross-tie, the less strain there is on the rods. This is a point that is too apt to be overlooked in the matter of trussing. Too many cars are trussed as shown in Fig. 2, by using an iron bar *U* which is usually bolted to bottom of side-sill at or near the bolster, the body truss-rod being attached to it by a knuckle-joint. In order to get a proper truss without extra strain at the points of attachment to side-sill, the body queen-posts *n* must necessarily be very long. When only two truss-rods are used, and these near the side-sills, the cross-ties should be trussed so as to keep the center of car in line with side-sills. Hook-bolts should be used at *w* to tie belt rail securely to sill, as the position of braces at that point tends to crowd the belt-rail and sill apart.

It is just as necessary to brace the ends of a car as it is the sides. Many builders, however, use no bracing at all in the ends, which accounts for so many cars being racked out of square, and especially such as have end windows. Fig. 4 represents two methods of end-bracing, one for end-window cars, and the other for cars without end-windows. In baggage, express and postal cars the long brace can always be used. These cars are often built without end-braces, the result being that the end-sills, having nothing to sustain them in resisting the strain of the over-hanging draw-bars, soon give way; whereas, if there were braces cut in flush with face of posts, end-sill and plates, and set so as to brace toward the door, with a tie-rod *z* through plate and end-sill, it would be next to impossible for the car to sag at door, or where the draw-timbers are attached to end-sills. These two methods are indicated by the braces *X* and *Y* respectively. If the short brace *Y* is put in properly, which is not always the case, it is very serviceable. It is often put in like the braces shown in Fig. 1, and sometimes as in Fig. 2, the effect being the same in the ends as in the sides of cars, that is, to crowd the corner posts out of place. The proper way is to halve the braces in flush with posts, the end of car to be squared before the braces are cut in. Then a cross-tie rod should be put in from door to corner-posts under belt-rail. It is very essential that the top of brace should be against the door, and the bottom end against corner-post, as shown, in order to sustain the end-sills at their centres. When they are put in the reverse of this, as is too often the case, half of their usefulness is thrown away. Cars constructed as indicated in Figs. 3 and 4, will wear the longest and stand the hardest knocks; and if any car-builder has ever tried this plan and afterward gone back to Figs. 1 and 2, he should let it be known, and give the reasons therefor, for the benefit of others.

THE Old Colony Railroad Company are introducing an improvement upon the head-lights of its locomotives in the shape of a patent apparatus by which the engineer of a locomotive can draw colored screens across the headlight, and thus signal "danger" or "caution" to other engineers. Connected with the device is an arrangement for holding figures denoting the number of a train.

Communications.

Uniformity in Car Construction.

To the Editor of the National Car-Builder:

Uniformity in car construction may seem at this time to be an old and worn-out subject, but experience teaches that there are certain objects which, however desirable they may be in themselves, and however plain the argument may be in their favor, can only be attained by persistent hammering and by steady and constant reiteration. One would suppose that any intelligent car-builder on a road receiving foreign cars to any extent must necessarily see and realize at once the great economy, to say nothing of the saving of time and other advantages, of a uniform standard for at least certain parts of freight-cars. Nevertheless, there still exists to-day the widest diversity, not only between different roads, but even between different divisions of the same road. And it was only the other day that the master car-builders of a group of roads that have been under the same control for years met for the first time, to establish a standard to which the cars of those roads are to be made to conform. All this, too, after the subject of uniformity has been discussed year after year at the master car-builders' meetings, from almost every point of view.

Perhaps car-builders are not so much to be blamed after all for this. A master car-builder is to be guided to a great extent by the instructions of his superintendent or general manager, and those offices are generally filled by persons who unfortunately do not appreciate the difficulty or importance of the questions which come before the chiefs of the car and locomotive departments. The superintendent is usually a man who has worked his way up through the train dispatcher's office and has developed capacity for handling of trains and the management of traffic; or he has been general freight agent and has been unusually successful in securing business for his road; or worst of all, he has been a civil engineer and is filled with an abounding sense of his own universal knowledge and a contempt for all mechanical engineers. In either case he is too apt to look down upon the men who are charged with the building and maintenance of the rolling-stock, and to consider their department somewhat of an excrescence upon the road, a necessary evil to be put up with, but to be kept in check and snubbed in every possible way. I do not mean to say that this is always the case, but it is too apt to be the result of the unnatural dependence of the mechanical upon the operating department. A few far-seeing managers have had the good sense to put the departments upon an equality, and to make the master mechanic and the master car-builder independent of all by the chief authority of the road; but these cases are not many, and it is too generally the rule that the master car-builder can do nothing without the permission of the superintendent, who knows little or nothing of the matter in hand, who cannot be made to see the need of any change, and whose sole idea is to keep down present expenses, without any regard to what a wise economy demands for the future.

But all the blame for the slow progress we have made toward uniformity in car construction can not be laid upon superintendents and managers. Some of it must be shouldered by the master car-builders as well. The great trouble has been and will be that every master car-builder believes in uniformity, but he wants *his own car to be the standard*. Now, I do not mean to say that car-builders are more conceited or more obstinate than other men, but they are naturally prejudiced in favor of their own ideas, and they do not interchange thoughts and opinions as much as they should. A car-builder sees a defect in construction; he goes to work and, after much study and sometimes a little experiment, he devises a remedy. It works well enough; he is satisfied and naturally a little proud of it. But meantime another device for meeting the same defect has been reached on another road by another man, who is also satisfied with his plan, and a little proud of it too. Each is unwilling to give up his own invention or to admit that the other man's is better; each has secured the adoption of his device on his own road and will stick to it. Now, by this gradual process of development, as it were, the differences in car construction grow greater continually—slowly perhaps, but surely, and the prospect of anything like substantial uniformity grows more and more distant. But if these two men (taken as an instance) had been in the habit of meeting or corresponding occasionally, what is more likely than that they should discuss the point that had occurred to both and should finally agree upon something which would cover the point for both? Here would be a step toward, instead of away from, a uniform standard.

The arguments in favor of uniformity are sufficiently well-known and, perhaps, it is hardly necessary to repeat them. Every one knows how far cars travel now-a-days, and how extensive the interchange of cars is, so that on many roads the mileage made by foreign cars is greater, or at least as great, as that of those owned on the road. Every master car-builder knows the difficulty and delay in repairing a foreign car that breaks down on his road, and the impossibility on small roads; the trouble and expense on larger ones, of keeping the vast stock of patterns, brasses, boxes and other things necessary for prompt repair of a disabled foreign car. Sometimes even the simplest break can not be repaired, and a car that should be detained for a few hours only, is kept days idle, earning nothing and cumbering up the yard, simply on account of the endless diversity. These and many other arguments come at once to the mind of every master car-builder of experience.

The chief arguments against uniformity are that it is impossible, and that the adoption of a uniform standard would put an end to all improvements. Now, I know that the attainment of uniformity is difficult, but I do not at all admit that it is impossible. It needs only to put the matter before managers so that they can understand it in its true light, and it must come. And it is a great matter of encouragement that what is notoriously the most obtuse and brainless management in America has at last been brought to listen to the arguments of its capable subordinates, and to give them a chance. When this is done there is hope, to say nothing of the weight which the example of a great road will have upon others.

As to the second objection, I do not think that by uniformity any one who advocates it means the adoption of such a cast-iron standard as shall preclude the trial or adoption of any improvements, or the use of any variation in construction to meet local needs. That would not be possible or desirable. What is meant is the adoption of uniform standards for running gear, and for such parts of cars as are chiefly liable to injury by accident or wear. Certain standards have already been adopted by the Master Car-Builders' Association with some success. The standard axle has already made much progress toward general adoption, though by no means what it should have done; the standard axle-box and pedestal have made slower, but at least, some progress. The adoption of standard cars by all the Vanderbilt roads is another step forward. Even in the South, where the interchange of cars is less and the roads more isolated, a tendency has lately been developed toward uniformity, and an encouraging appreciation of its advantages.

I hope that the subject will be fully discussed at the coming convention. And I hope that my fellow master car-builders will not allow it to rest there. Let us, brethren, not only talk and listen at the convention, but let us go home and think about it. Let us talk about it to our neighbors on adjoining roads whenever we can meet them, write letters when we have a chance, and keep the subject continually under discussion. For it is only by such constant discussion and friction between various minds that any real progress can be made toward this extremely desirable and important object. Do not let us be discouraged by slow progress. Time is a necessary element in all reforms, and every step forward, no matter how small, counts something.

Very much more could be said on this subject, but it would be far beyond the limits of a communication of this kind. And to set your readers thinking, not to exhaust the subject, is the aim and object of your correspondent. M. C. B.

Clarke's Improved Live-Stock Car.

To the Editor of the National Car-Builder:

One of our leading railroad men has called my attention to the descriptive notice of my improved live stock car, and editorial comment thereon, contained in your April number. As you have doubtless not seen either a drawing or model of my car, you could not well express an opinion as to its merits, and certainly could not question the opinions of those who have carefully examined both. You will, I feel assured, be pleased to learn that the car is in a fair way to be practically tested, as the Canadian government is about to build a number of them.

Your idea that the problem of carrying cattle is all comprised in the matter of floor space, corresponds with the views of all practical men who have not had an opportunity to examine my car; but you all seem to have overlooked the fact that only a small space is needed for the head and neck part of the animal, whether standing or lying down. My car is of the ordinary size, 32 ft. long by 8 wide, and accommodates 16 animals. It has been admitted by all who have examined the car, that this part of the problem has been satisfactorily solved, and consequently, we propose to cheapen the cost both to railroads and shippers, by sending live-stock trains "right along," with but one or two men at the most to attend to a train of twenty cars, to say nothing as to the saving in the cost of feeding.

You say that "the feeding, watering and resting, to be of any service to the animals, must be done outside the cars." May I ask why? A back yard on shipboard for such purpose would no doubt be very desirable, where the poor brutes are stowed in as close as possible, and suffer not only from the tossing and rolling of the vessel, but from bad ventilation, which is not the case with cars. Yet it is an undisputed fact that a voyage of from two to three weeks is far less injurious to the animals than a week or ten days' transit by rail. And why should there be this difference when the odds are all in favor of the cars, if the animals can be fed, watered and cleaned with the same regularity as on shipboard, and with the added advantage of pure air? We often take things for granted as actual facts, which turn out to be fallacies under practical test, and it is just possible that some of the prevailing ideas in regard to live stock transportation will be dispelled with the march of progress.

I agree with you that it is not only injurious, but barbarous, to keep animals on their feet for 30 hours at a time, and even more so to keep them that long without food and water. This, more than any thing else, causes them to lose in weight when shipped as they now are by rail. There is no necessity for this, as it is found by actual test

that they can, without additional expense, be conveyed from one end of the continent to the other without deterioration. Should you feel disposed, Mr. Editor, to examine the car in question and call the attention of your readers to its merits, I will furnish a model for that purpose at on early day.

THOMAS CLARKE.

TRURO, N. S., May, 1880.

[The car which our correspondent has invented, and of which we gave some account in our April issue, may be all that is claimed for it. But as it only exists as yet in the form of a model, its merits must be taken on trust until justified by actual performance. It is certainly a good point in its favor that the Canadian government is about to build some of them. They will then be loaded with live-stock and started over the roads, and the result will be manifest to everybody who is interested in this class of transportation. The construction of the car may be such as to change the existing relations between a given area of floor space and the space occupied by a certain number of animals, large or small, that are now held to constitute a car-load. If these animals—say 16 horned cattle of average size—can be separately stalled in a 32-foot car, so as to rest, and be fed and kept comfortable during a continuous trip of five or six days, with no injury to their market value, there is no reason why the new method should not be at once and universally adopted. Our correspondent, however, does not specifically point out how this is done, but merely says that railroad men who have examined the model are satisfied that the problem of car space and animal bulk has been successfully solved, leaving those who have not had an opportunity of seeing the model, entirely in the dark as to how the solution is accomplished.—ED. CAR-BUILDER.]

Freight-Car Construction.

To the Editor of the National Car-Builder:

One of the hopeful signs of further improvement in the construction of railroad cars is the earnest discussion of this subject that is now taking place. The different views that are presented can hardly fail of producing a good effect, but the desired uniformity, I feel constrained to say, is not likely to be realized in the near future. Some will favor a swing motion and others a rigid bolster for trucks; some will advocate continuous draw-bars while others will prefer some other kind; some will want brakes hung to the car-body and others to the truck; and those who favor a large heavy car will necessarily want large journals and journal-bearings, and so on. Those who hold to these different opinions will, in their desire for uniformity, aim to produce a standard as free from objection, from their own points of view, as possible.

In an article published in the CAR-BUILDER for February, the writer is already committed to a large freight car, and the correctness of this theory has since been confirmed by personal observation and the many cars that are now being built with a carrying capacity of 40,000 pounds. A few words in reply to some of the arguments against the utility of large cars may not at this time be out of place. It is claimed that the average weight of a car-body is about 400 lbs. per lineal foot, and that if the body is shortened eight feet, the weight of the body is reduced 3,200 lbs. This is certainly not correct. The same body-bolsters, cross-ties, end-timbers, draw-bars, etc., are required for the short car as for the long one. The middle of the car-body, or that portion between the cross-ties, certainly does not weigh as much per lineal foot as the rest of the body, nor does it cost as much. For example, in four 30-foot cars we have 120 lineal feet, which is equivalent to five cars 24 feet long; but it will hardly be claimed that the four long cars will weigh as much as the five short ones, nor will their construction cost as much. Another thing which has led to erroneous conclusions, as it seems to me, is in reference to the weak points in cars in general use. There is doubtless great carelessness in loading certain kinds of freight. Pig iron is often put in cars and piled much higher in the middle than over the trucks. But should a long car be condemned for breaking under such circumstances, when it is obvious that a short car could be broken in the same way?

A common size for 30-foot sills is 4×8 inches. The strength of these sills is frequently reduced 25 per cent. by the boring of bolt-holes for attaching the cross-tie pieces, when they might be much better secured by U or L bolts. This applies also to other parts of the car in which the boring of bolt-holes not only weakens the frame, but lets in the water and rots the timber. With respect to sills, however, an important matter to be considered is their relative strength. Take, for instance, two sills, one 3×10 in., and one 4×8 in. The difference in size and also in weight is as 15 to 16, and their relative strength in the car structure as 75 to 64—the 3×10 sills being about 6 per cent. lighter and 14 per cent. stronger than the 4×8 sills. If our cars are 30 feet long, and we place the centers of body-bolsters 7½ feet from the car-ends, the distance between bolsters would be 15 feet. Then if the load is distributed equally over the entire length of the car, there would be very little breaking strain on the center of sills when not in motion and until they broke over the bolsters. While I would not positively recommend this apportionment of distance, I do think that the bolsters should be further from the ends of long cars than they usually are. The Chicago & Alton 20-foot 4-wheel car, to which reference is made by your correspondent "M. M." in your February issue, will not break down at the center—the tendency being, on the contrary, to break upward at the center by concussion, and downward at the ends by weight of both load and concussion, thus indicating that the weak points in the sills are at the bolsters.

There is one other matter I would refer to in this connection, although it may seem uncalled for in view of the final decision that has been made in reference to the form and dimensions of a standard car-axle. The "M. C. B." standard is doubtless as perfect as any axle can be to secure general approval; but in my judgment the center of the journal is too far from the wheel. There are many axles with 7-inch journals, running on our roads, that are only 6 feet from center to center of journals, while the M. C. B. axle is 6 ft. 3 in. Now a little figuring will demonstrate that on a standard gauge track, the relative carrying capacity as to bending or breaking, of an axle 6 ft. 3 in. and 6 ft. between centers of journals, is as 13 to 16, supposing their diameters to be the same. That is, if a car with the long axles will carry 13 tons, a car with the short ones will carry 16 tons; or if 40,000 lbs. is the maximum for the long axles, the maximum for the short axles will be 49,210 lbs., showing a difference of a little more than 25 per cent in favor of the latter.

L.

A Fast Passenger Locomotive.

A locomotive differing very materially in its construction from the ordinary American type of passenger engines, has recently been built by the Baldwin Locomotive Works, to run on the Bound Brook line between New York and Philadelphia. As a good many erroneous statements have been published in regard to its dimensions and details of construction, we copy the following particulars from the *Railroad Gazette*, which also publishes a full-page engraving of the engine:

There are eight wheels in all—2 drivers 6½ ft. in diameter, with cast-iron centres, solid spokes and hollow rim; 2 trailing wheels 45 in. diameter, with cast-iron centres and steel tires, and 4 truck-wheels 36 in. in diameter, same make.

The driving-axle journals are 8 × 9½ in.; those of the trailing-axle 7½ × 8½ in., and those of truck-axles 5 × 8 in.

Cylinders, 18×24 in.; total wheel base, 21 ft. 1 in.; centre of driving to centre of trailing-wheels, 8 ft.; boiler of ⅞ steel, and 52 in. in diameter at smoke-box end, contains 198 tubes 2 in. diameter and 12 ft. 2¾ in. long; fire-box 96½ in. long, by 84 in. wide, 51 in. deep in front and 44 in. back; steam ports, 1⅝×16 in.; exhaust ports, 3×16 in.; Allen valve, ⅞ in. lap; boiler has 1,400 square feet of heating-surface; weight of engine in working order, 85,000 lbs.

In order to provide against an excessive weight on the single pair of drivers, and at the same time have sufficient for adhesion in starting and in ascending heavy grades, an equalizing lever is arranged so that the weight upon driving and trailing wheels can be varied according to circumstances—ranging from 35,000 to 45,000 lbs. on the former, and from 15,000 to 25,000 lbs. on the latter. The weight on the truck is 25,000 lbs.

There being but a single pair of driving-wheels, there are, of course, no coupling-rods, nor the breakage to which they are liable in fast passenger engines.

The following is the record of a run made by this engine May 14. From Philadelphia to Jersey City, distance 89.4 miles, with train of four passenger-cars, time, 1 hour and 38 minutes. The return trip, with a train of five passenger-cars, was made in 1 hour and 40 minutes, the first run averaging a mile in 65.6 seconds, and the second a mile in 67.1 seconds. No stops were made.

The Allen Paper Car Wheels.

These wheels appear to be making an excellent record. The testimony in their favor is very uniform in its tenor, the following being samples:

The Superintendent of the Delaware, Lackawanna & Western Railroad writes us that he considers them the best wheels in use so far as he can judge from an experience of fifteen months with them. The sleeping car "Syracuse," on his road, has been running with them eleven months, and has made a mileage of 101,725 miles with scarcely any wear. They will run another season without turning. The road has four parlor and three sleeping cars equipped with them, also the trucks of twelve locomotives, and is putting them under engines when renewals are made.

The Michigan Central road has but one pair of these wheels in service as yet, but will have several more of them running in a few days. The pair already in use have been in continuous service for about a year, and have run during that time 60,-.26 miles under a passenger car, the tread wearing away about one-sixteenth of an inch.

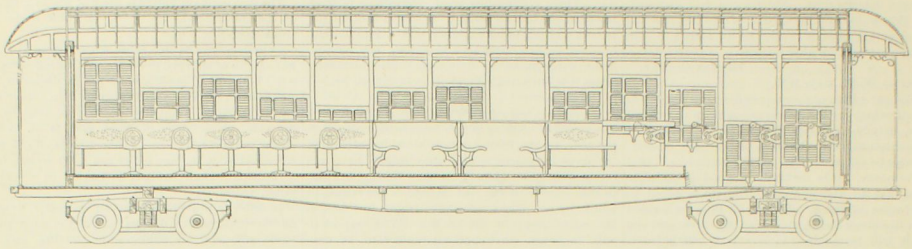
The President of the Indianapolis, Decatur & Springfield road says that the wheels are in every way a success, and that he would use no other under new engines or any equipment.

They are also doing good service on a number of other roads, the record of which we shall publish from time to time as it may be furnished from official sources.

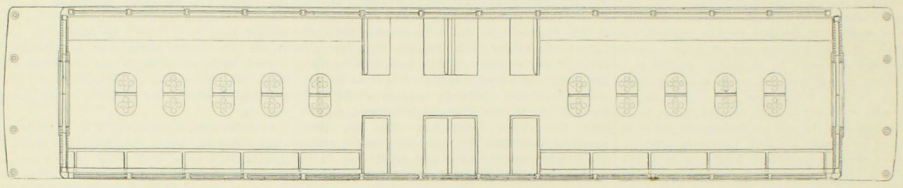
THE Marks improved railway reclining chair will be on exhibition at the Michigan Exchange Hotel, at Detroit, on the 11th of June, where its operation can be seen. It has been successfully used on a number of roads.

THONET BROS., 814 Broadway, New York, have furnished three parlor cars, running between Philadelphia and Cape May for the Pennsylvania Railroad Company, and between Philadelphia and Atlantic City, with revolving cane seat and back chairs, of bent wood, from special designs for this company.

A NEW PASSENGER CAR FOR SUMMER TRAVEL.



Side View of Interior.



Plan, Showing Seats.

THE engravings illustrate a new passenger car for summer travel, designed by Mr. H. J. C. Kraus, M. E., 34 Park Row, New York. It is more especially intended for short trips between large cities and seaside or other resorts; also for elevated railways and suburban travel.

The body of the car is 40 feet long by 8½ feet wide over all, and has the usual number of side seats. There are also 10 double seats in the center, as shown, which are made to fold automatically when not occupied—these, with the side and cross seats, making 76 in all. The arrangement of the windows is somewhat peculiar, but well adapted to the service for which the car is designed. They consist of a slatted sash, 33 × 36 inches, with a single glass 12 inches square in the center. By means of a device located behind the seat, as shown at the right-hand end of the upper drawing, the sash can be balanced at any desired height without being affected by the movement of the car. The doors are 6½ feet high and 40 inches wide, made in two equal parts, and so arranged that when one-half slides into the casing the other half slides also. The devices for moving both windows and doors are easily worked and accessible. One of these cars is now being built at Wilmington, Del., and it is expected that others will shortly be constructed to be used the coming season on one of the Coney Island roads.

Wagner Sleeping-Cars.

The following are the specifications for twenty of these cars that are now being built at the Gilbert & Bush Co.'s Works, at Troy, N. Y., for the New York Central & Hudson River Railroad :

Dimensions.—Length of car outside of panels, 65 ft. 9 in. Width of car outside of panels, 9 ft. 7½ in. Height of car from bottom of sill to top of plate, 7 ft. 8¾ in. Height from bottom of sill to top of raised roof, 10 ft. 3½ in.

Size of Timbers.—Side-sills, 5 × 8 in.; floor timbers, 4 × 8 in.; end-sills, 6 × 8 in.; arch timbers, 3 × 8 in.; 2 cross-frame tie-timbers, 5½ × 9½ in.; 3 cross-frame tie-timbers, 3½ × 8 in.; side plates, 2¾ × 4½ in.; truss plank, 2½ × 12 in.; posts, 2¾ × 3½ in.; end-plates, 2½ × 14 in. Sills, floor timbers and plates to be of Georgia pine; end-sills, cross-frames, tie-timbers, platform and truck timbers to be of white oak; end-plates, corner-posts, studding and all other small timbers to be of white ash.

Plan.—Car to be divided into twelve open sections, one state-room, one smoking-room, linen closets, toilet-rooms, heater-room, etc. Sections, state-room and smoking-room to be 6 ft. long in the clear.

Truss-Rods and Transoms.—To have 4 longitudinal truss-rods 1⅛ in. diameter, with 1½ in. ends, and turn-buckle in centre. Transoms to be of iron 7 in. wide, top bar ⅝ in. thick, bottom bar 1 in. thick, welded at the ends.

Roof.—To be covered with No. 26 galvanized ferro steel lapped 1 in. at the joints, and fastened well to the roof with screws and thoroughly soldered.

Platforms.—To be the standard Miller platform as used by the New York Central & Hudson River Railroad Co.

Finish.—The external finish to be plain and neat, with "square" window heads and flat-beveled panel mouldings—all to be well painted and neatly ornamented in modern style. The internal finish, including vertical partitions, berth partitions, berth panels, also window finish, window sash and window belts or panels, to be finished in selected St. Domingo mahagony and rosewood, to new designs, and finished throughout with first-class workmanship—superior to that of any cars now in service. All the doors to be of mahagony. The end doors to be 1¾ in. thick. The berth partitions to be extra thick and stiff. The saloon and wash-room fixtures to be same style and pattern as those used in the best cars now in service. Raised decks to have full sash with "automatic" ventilators between each two sash, the glass for the inside sash standard size neatly embossed. The deck ceilings to be light-colored three-ply veneers, divided with neat mahogany panel mouldings, finished and decorated in the best manner. Smoking-room seats to be sofas, upholstered with leather.

Side-Sills and Floor Timbers.—To be mortised into end sills, with double tenons 1½ in. long and 1½ in. thick.

End-Sills.—To be furred out between the corner and door posts with a white oak furring 1¼ in. thick and 8 in. wide, fastened to end-sill with not less than eight ½-in. lag screws.

Center Timbers.—The two center floor timbers to be placed 6 in. apart. The intermediate timbers to have their inside face 1 ft. 5 in. from center of car.

Arch Timbers.—The outside or arch timbers to have their inside face 1 ft. 9 in. from center of car at end, and spring in a regular curve from end to end, so that center of timbers will rest against outside sill in center of car and bolted to same.

Floor.—Car to have a double diagonal floor, first course to be of dry white pine tongued and grooved, free from sap, shakes and loose knots, and of sufficient length to come outside of sills. Second course to be best quality of dry Georgia pine, tongued and grooved, entirely free from sap, shakes and knots, to be 1⅜ in. thick and not exceed 4½ in. wide, fastened to sills and floor timbers with 3½ in. screws, one to each and floor timber. Paper to be put between diagonal and upper floor, and an intermediate floor of ⅛ in. white pine, tongued and grooved, to be cut in between the sill half way between upper and lower floor.

Bottom Ceiling.—Bottom of car to be ceiled with dry white pine ceiling ⅜ in. thick, tongued and grooved, free from sap, shakes and loose knots, to be laid cross-wise the car, and that portion laying between the two transoms to be on bottom of floor timbers and lap on the sill 1½ in.; must be well nailed, the ends beveled or rounded, and that portion between the transom and end sill, and is to cut in between the sill and floor-timbers, and flush with the bottom of same. It is to be well secured to strips nailed to sills and floor timbers.

Transom.—From center of transom to face of panel 7 ft. 8 in. to be let into sills and floor timbers ⅛ of an inch, secured by two ⅝ in. bolts passing through each sill, one through each outside floor or arch timber, and two through each intermediate timber and center-plate, bolts to pass through the center floor timber.

Truss Timbers.—Center of truss timbers to be 12 ft. apart, boxed into sill ½ in. on, and 1½ in. up, and locked into all the floor timbers as follows: Gained ½ in. out of truss timbers and 1 in. out of floor timbers, secured to sill by two ⅝ bolts 1½ in. from each edge, and each floor timber by one bolt of similar size placed 1½ in. from each alternate edge.

Tie Plank.—The three cross-tie planks are to be placed one in center of car, and one in center between center of truss timber and transom, boxed into sill ½ in. on, and 1½ in. up, locked into floor timbers by gains same as truss timbers, and secured by bolts of similar size and position.

Truss-Rods.—Center truss-rods to be 3 ft. 8 in. from center to center. Outside truss-rods to be 1 in. from inside face to sill, the rods to pass under a support attached to floor timbers extending down 10⅝ in. to centre of rod, and over a bearing resting upon the transom, thence through the end-sill midway down and through a wrought-iron plate ½ in. thick and 4 in. square; plate to be let in flush with face to sill.

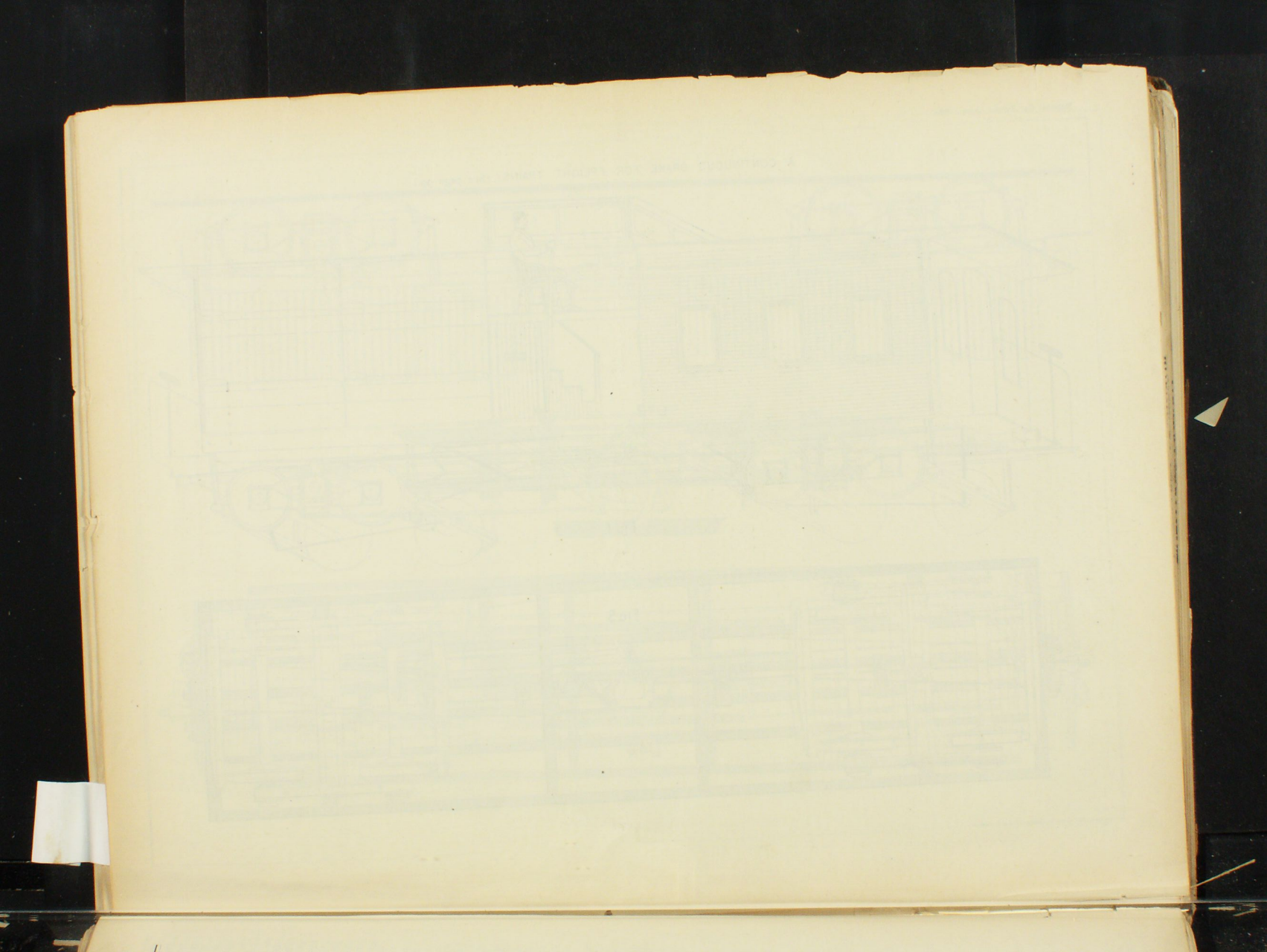
End Support.—End of car supported by iron rod 1 in. round, passing diagonally through side-sill and welded to flat bar of iron 2½ × ⅝ in. let into inside face of studding directly under window sill, and fastened to studding with screws, then welded to similar rod at opposite end of car, the whole to rest on a cast iron support directly over transom, the end of rod to pass through sill 6 in. from end of car, and then through a large cast iron washer fitted to angle of rod to make good bearing for nut.

Truss Plank.—To rest on top of floor and secured to post with two ½ in. truss plank screws 4 in. long and bolted to sill by ⅝ in. bolts placed 4 ft. from center to center.

Carlines.—Carlines of main roof to be 2⅝ × 1¼ in., placed 18 in. from centre to centre. Carlines for raised roof to be 2⅛ × 1¼ in., placed about 14 in. apart; roof to be supported by 8 iron ribs or carlines passing from side to side of car over raised roof, to be made of ⅛ × 2⅜ in. iron with foot on each end to bolt to plate.

The cars are to have New York Central Standard Trucks and Allen's Paper Wheels, and to be equipped with Westinghouse Air-Brake. Carpets are to be of special design by W. & J. Sloane; blankets expressly manufactured by the Pontoosic Manufacturing Co., Pittsfield, Mass.; and sheets of pure linen made to order in Glasgow, Scotland, with "Wagner Car Co." worked in each.

"CORN-BREAD, sir?" said an Irish waiter, freshly imported, to a guest at a hotel. "Isn't it corn bafe ve mane?"



A CONTINUOUS BRAKE FOR FREIGHT TRAINS. (See page 99.)

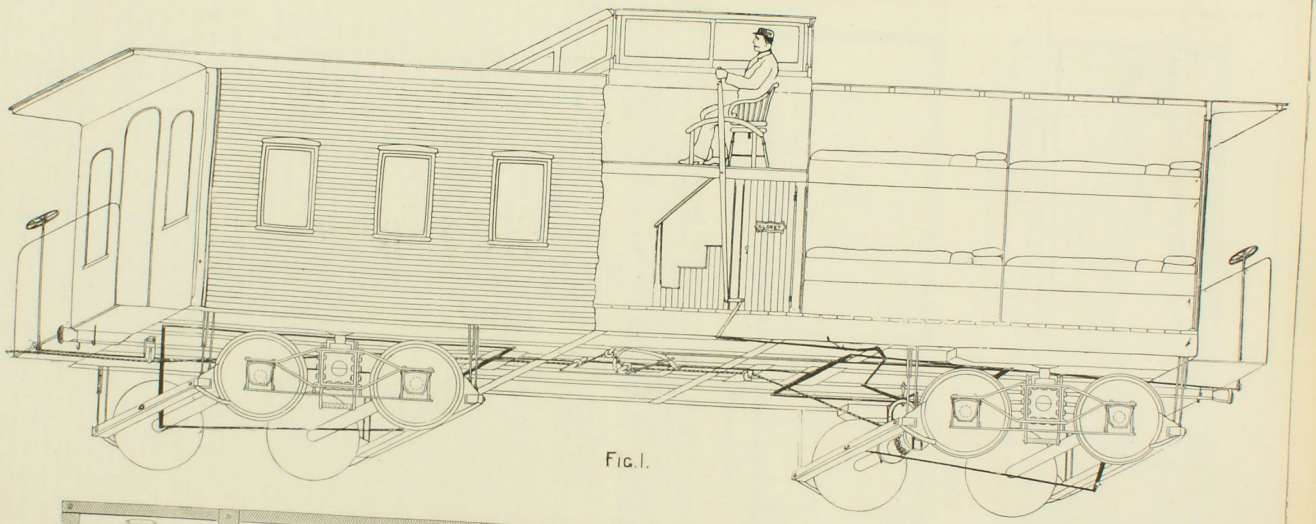


FIG. I.

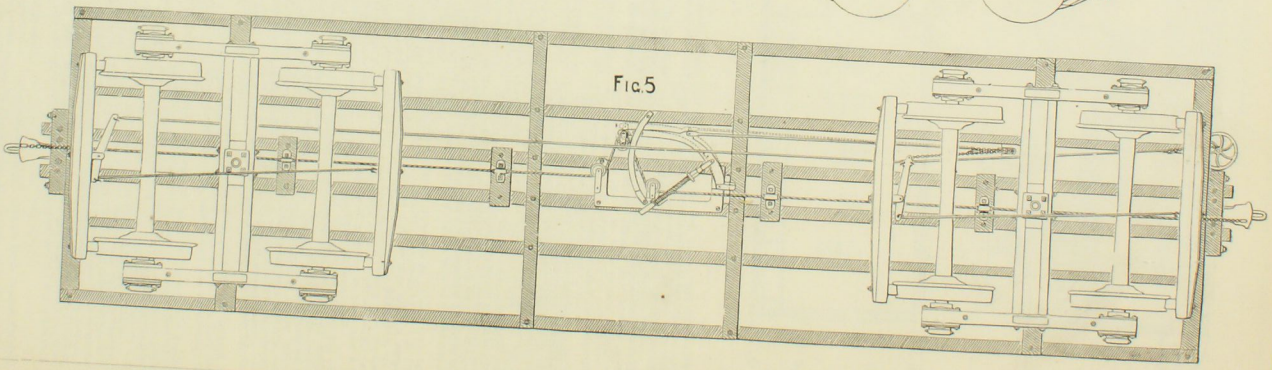


FIG. 5

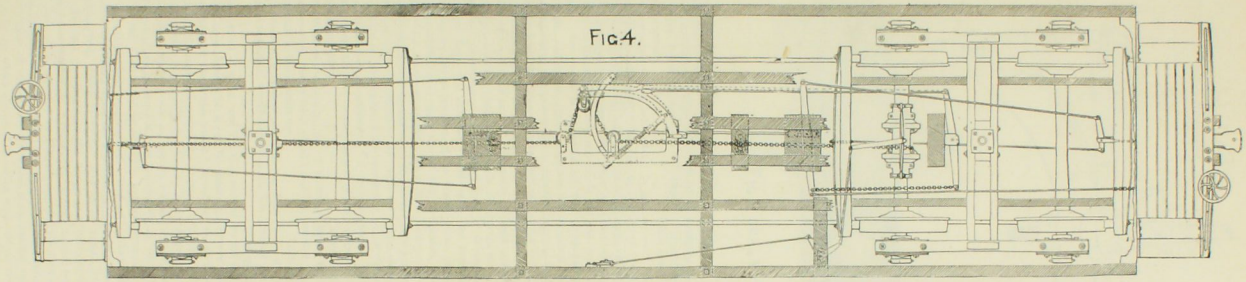


Fig.4.

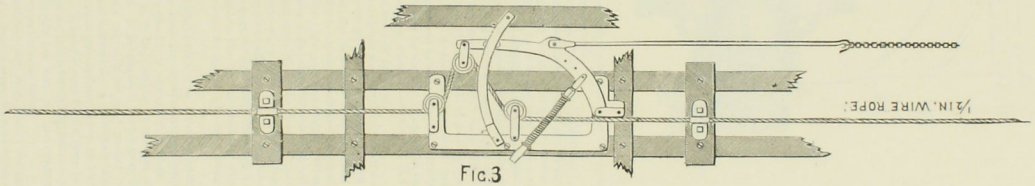


Fig.3

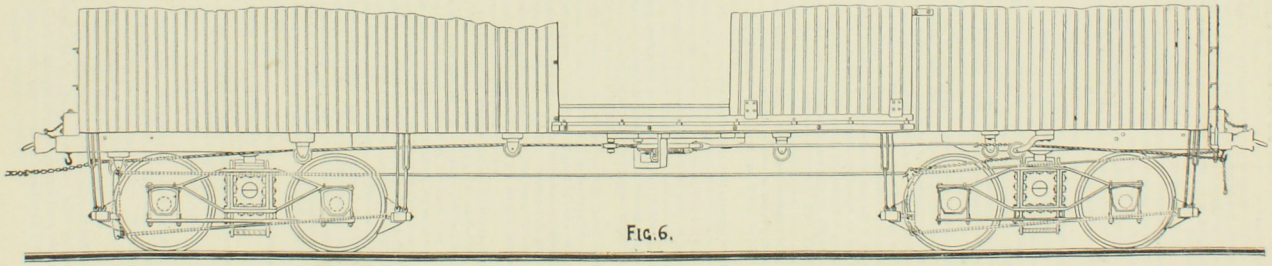


Fig.6.

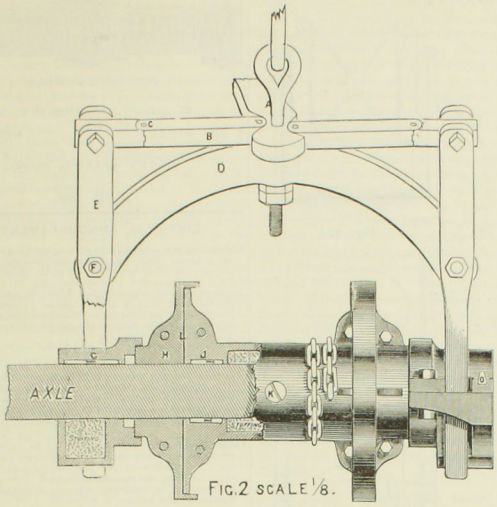


FIG. 2 SCALE 1/8.

THE two full page engravings in connection with the above cut, illustrate a brake for freight trains of which the American Standard Brake Company, of Boston, Mass., are the manufacturers.

This brake is to be attached to the locomotive to act upon the cars at the forward end of the train and to the caboose, to act upon the car at its rear end. It can also be operated from the caboose to act upon the cars behind it, as well as those in front, when the caboose is in the middle of a train. Its power is imparted by the momentum of the train, and it is applied to operate the usual brakes of freight cars, the power being applied directly to such brakes from the locomotive or caboose, each of which can operate eight or ten cars.

The device consists of a reel upon one of the axles of the tender or caboose, to which is attached a chain connected with a wire rope, the rope passing backward from the tender and forward from the caboose, under each car; the reel operating by the momentum of the train, to wind up the chain sufficiently to apply the brakes to all the cars with which it is connected, when it is clutched by the clutch or friction flanges upon the axle.

Fig. 1 of the drawings shows a caboose car with the clutch and reel upon the forward axle of the rear truck; it also shows the position of the mechanism for operating the clutch, the arrangement of the brakes and of the mechanism for operating them.

Figs. 2 and 3 are detailed drawings; fig. 2 showing the mechanism attached to the tender or caboose-car, and fig. 3 that attached to the freight car.

Fig. 4 shows the frame of a caboose-car with the floor removed. The same appliance would be put on the tender.

Fig. 5 shows the bottom of a car, and fig. 6 a partial side elevation. All these figures (4, 5 and 6,) show the position of that portion of the device which is attached to the freight-car, and its connection with the brakes.

In fig. 2, *J* represents a reel, which fits loosely upon the axle, and contains a stuffing-box, as shown, which is filled and oiled through an aperture *K*. *H* is a clutch (one at each end of the reel) keyed to the axle, so that it will slide on the axle, to and from the reel. Beyond the clutch is a collar, *G*, resting upon the axle, and provided with a stuffing-box, which is stuffed and oiled after removing the cap *O*. Between the flange and the reel is a sole-leather washer, *L*. *I* shows the babbeting. A forked lever, *E*, is pivoted at *F* to a yoke, *D*, and embraces the collar as shown. The yoke *D* is suspended from the bottom of the car by a rin, bolt (passing through the lever *A*), which allows it to swing with the movement of the cars. *B* and *C* represent a toggle-joint lever connected with the forked lever *E*. A chain is shown, fastened to the reel.

When the conductor desires to put on the brakes, he takes hold of a lever as shown in fig. 1, and through a series of connecting rods, as there shown, operates the lever A shown in fig. 2, by means of which the toggle-joint and lever *E* press the clutch forcibly against the reel, which then begins to revolve, winding up the chain and drawing toward it the wire rope, which rope is connected with an attachment on the bottom of the car, consisting of a series of pulleys, a bent lever and a spring, as shown in fig. 3, one side of the lever having attached to it a brake-rod as there shown. The rope is connected from one car to another by means of hooks, each car having a similar attachment—the end farthest from the reel being securely fastened.

When the reel is clutched and revolved with the axle, the bent lever shown in fig. 3 is drawn toward the rope, pulling back the brake-rod and applying the brakes, the operation being carried on simultaneously on every car with which the rope is connected. When the rope has been drawn sufficiently tight the reel will remain stationary; but the clutch will revolve against it until the train is stopped, or the clutch released from its hold. The reel revolves sufficiently to take up the slack of the rope (perhaps six or eight feet), and when it is released from the clutch, the springs connected with the bent lever, as shown in fig. 3, at once release the brakes.

Each car is provided with a rope, fitted at each end with a chain and hook for convenience of coupling; which chain, when the car is uncoupled, is hung on a hook as shown in fig. 6, the coupling being also shown in the same figure. In the engine is a lever next to the reverse lever, or (as the engineer may prefer) underneath the footboard is suspended a rock-shaft, which is operated by the foot of the engineer, when he wishes to apply the brakes. A lever is used for the same purpose on the conductor's car, and is located opposite a window, so that the conductor can look out and control the brakes by the lever at the same time.

As already stated, the force employed in the application of the brakes is derived from the momentum of the train. In attaching the brake to the conductor's car or caboose, two principles are involved in the stoppage of trains, which may be termed push-back and pull-back, the former being illustrated by the power applied from the engine. In freight trains the application of this power results from the pressure behind of heavy cars whose momentum has not been checked by any brake attachment on or behind them, causing concussion, pounding and wear and tear while the train is being stopped. This is remedied by the pull-back power exerted by applying the brake from the rear of the train. It seems to be a fact that a pound of pull-back force applied to the stoppage of a train is worth two pounds of push-back force. Then, again, if a freight-train parts in the middle, the rear end, having the power brake, could be easily controlled by the conductor, so as to prevent collision. This power-brake is also economical in switching, as it saves reversing the engine to stop the train. The conductor's car is supplied with an attachment that works both ways; that is, it will not only operate in front of the car, whichever way it is run, but in the rear of it, so that this car can have freight-cars in the rear and front, and control both.

In the discussion of the subject of freight-train brakes by the Master Car-Builders' Association, at its recent annual meetings, the most serious objection urged against the utility of power or continuous brakes, was the difficulty of applying them to mixed trains, resulting from the present extensive interchanging of cars between different roads. This objection, however, is easily obviated with this brake. Only a few cars are required to be equipped with it on a train in order to control the train, and each road adopting it could regulate its traffic so as to always keep enough cars with the attachment on hand to meet its own purposes of freight transportation. The appliance itself is no bar to the car being used in ordinary trains controlled by hand-brakes. All that is needed when the car is sent off, is to attach the chains designed to connect the brakes of cars under the system to hooks, which are placed at each side of the draw-bar, where they have to be placed in any event when the cars are detached. The objection in question, therefore, is not a serious one, and, even if it were, need not long prevail, and probably would not, for railway men will not be slow to adopt a brake like the one described, when they find it will do all that is claimed for it.

The cost of the application will average, where it is generally adopted, only about $10 for each car. The plant on the engine will cost about $50, and that on the caboose, or conductor's car, about $35. It is on these that the reels are placed and operated, and which in turn operate the brakes on the cars following, or, as in the case of the conductor's car, following or preceding. But, as stated, the average cost per car, engine included, will not be over $10 each.

The invention has been carefully tested both as regards its practicability and its easy application to cars and engines. It has been adopted by two roads, and the amount of its wear and tear fully demonstrated by three years of continuous service. During this time it has needed but slight repairs, and has been oiled only once a month. The attachment to the freight cars needs no repairing and will last for years.

The leading advantages claimed for this appliance are: 1. The operating power being the momentum of the train, costs nothing. 2. It can be attached to the ordinary hand brake, without at the same time impairing its efficiency, so that, in switching, the hand brake would be still available. 3. It has been three years in active service, and has proved that it is efficient, durable, not likely to get out of repair, and needs very little care after it is applied to the car. 4. The cost of its application is very small, and the nature of its construction so simple that even if it required occasional repairs, as it undoubtedly may, they could never be expensive. 5. That it is under the control of the engineer at the forward end of the train, and of the conductor at the rear of the train.

The proprietors, as above, may be addressed at 40 Water street, Boston, Mass.

THE Michigan Car Co., at Detroit, now employs about 1,250 men, and is full of orders. It is building an addition to the foundry, and also several other buildings.

THE new car-works at Jacksonville, Ill., of which Mr. T. C. Dutro, of St. Louis, is President, are turning out four cars a day. They are working on contracts for the Texas & Pacific and the Kansas City, Fort Scott & Gulf roads.

THE Ohio Falls Car Company, at Jeffersonville, Ind., is at present crowded with passenger-car work. Several elegant coaches have recently been sent west, and a large number of others are in course of construction.

ALEXANDER'S IMPROVED CAR JOURNAL-BOX.

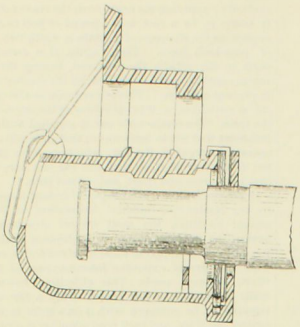


Fig. 1.

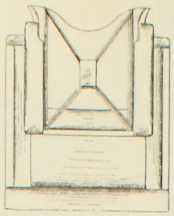


Fig. 2.

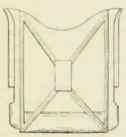


Fig. 3.

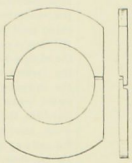


Fig. 4.

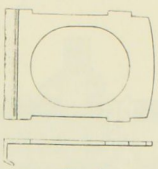


Fig. 5.

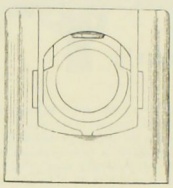


Fig. 6.

THE cuts illustrate an improved car journal-box in use upon freight and passenger cars of the Texas & Pacific Railroad. The improvement consists of two principal features—the peculiar construction of the box lid so as to prevent its being lost or detached from the box; and an oil-stop or dust-guard holder, by means of which the dust-guard may be taken out and replaced by a new one without removing the box from the journal.

Fig. 1 is a section of box and a portion of passenger truck pedestal, showing position of lid when open; fig. 2 is a front view of box with the lid closed; fig. 3 shows the lid separately; fig. 4, oil-stop or dust-guard; fig. 5, oil-stop holder; fig. 6, rear view of box.

The box-lid is put in place before the pedestals or arch bars are in position, or before that part of the truck is put together, after which it cannot be removed or separated from the box. The lid slides in tapering grooves, in which it preserves a perfect fit as it wears, requiring no bolts, nuts, rivets, springs, washers or keys. This simplicity of construction, with no liability of loss except from breakage, greatly lessens the cost. The dust-guard, with its holder, is shown in position in fig. 1. The holder weighs about 1½ lbs., and is cut with a die from No. 12 or 16 iron, at the rate of 60 per minute. The lower half of the guard is kept up to the journal by a spring, while the upper half rests upon it from its own weight. Both can be taken out and new ones put in in ten minutes.

The full details of the construction cannot be set forth without an amount of elaboration, both of drawing and description, that would rather confuse the reader than otherwise. What we have said will convey an idea of what the inventor has sought to accomplish, namely, a cheap, simple and serviceable oil-box, that will prevent hot journals, and save wear of brasses and waste of oil. Mr. F. M. Alexander, the inventor and patentee, Marshall, Texas, may be addressed for further information in regard to it.

THE Dunn & Havener patent Spark-Arrester, now in use on the Washington & Ohio road, run 103 miles with a train of three passenger cars, and collected four barrels of sparks and dust; and with a train of ten freight cars, seven and a half barrels were collected.

THE car-works of Murray, Dougall & Co., at Milton, Pa., were burned down May 14, in a fire which destroyed nearly the whole town.

THE Chicago Steam Forge Works are to be enlarged by an extensive addition that will very much increase their capacity. Although running night and day, they are three months behind on orders. They are now turning out 80 car-axles a day besides a large amount of steamboat shafting and other work.

THE car-works at Wilmington, Del., are running to their full capacity. The Jackson & Sharp Co., are turning out from four to six passenger and baggage cars per week, and the Harlan & Hollingsworth Co. have several large contracts from South America and Japan.

THE Pratt & Whitney Tool-Works, Hartford, Conn., are said to have now on their books orders for no less than 470 machines not yet delivered. They employ a force of 540 hands, and are cramped for room and tools.

THE Empire Car Works, at York, Pa., owned by Michael Schall, were destroyed by fire May 21, throwing 150 men out of employment. The loss is estimated at 50,000 on which there is a partial insurance.

THE Wason Manufacturing Co., at Springfield, Mass., has built 207 first-class passenger-coaches for the Central Railroad of New Jersey, since 1863.

THE Detroit Car-Spring Co. is making about 1,200 springs a day, and proposes to enlarge its works shortly.

NATIONAL CAR BUILDER

PUBLISHED MONTHLY
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JAMES GILLET, Editor.

JUNE, 1880.

EDITORIAL ANNOUNCEMENTS.

Subscription.—ONE DOLLAR *a year in advance, postage prepaid. One copy will be sent free for one year to any person sending us five new subscribers.*

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of the month.*

SUBSCRIPTIONS *to the* CAR-BUILDER *will be received, and copies kept for sale, at the following places:*

A. WILLIAMS & CO., 283 *Washington Street, Boston, Mass.*

L. SCHAFFNER, *Cigar and News Dealer, Grand Pacific Hotel, Chicago, Ill.*

WILLIE H. GRAY, 306 *Olive Street, St. Louis, Mo.*

ROBERT CLARKE & CO., 65 *West Fourth Street, Cincinnati, Ohio.*

DRAWINGS FOR THE CAR-BUILDER.

The attention of persons sending us drawings to be engraved for insertion in the CAR-BUILDER, is invited to the following points.

All drawings should be in black ink—the blacker the better. White paper is preferred, although tracing-cloth will do.

Reproductions are the best when they are from one-third to one-half the size of the original drawings; therefore the drawings should not, as a rule, be more than twice the size of the engravings to be made from them.

On a basis of twice the size, the lines in drawings should be twice as large or heavy as they will be in the engraving, and in like proportion for any other relative basis as to size.

The lines in drawings should be firm, clear and distinct. Very fine, close-lined details should be avoided, as they will run together and become confused in the photo-reduction.

These directions apply principally to plan and diagram work which is not shaded up, and which can be reproduced by the photo-engraving process without the necessity of redrawing.

THE MEETING AT DETROIT.

From all we can hear the meeting of the car-builders at Detroit is likely to be well attended. The place selected for the convention is central and accessible, and should bring together full delegations from the eastern, western and middle states, as well as a respectable representation from the roads south of the Ohio and Potomac. The meeting last year in Chicago was a decided improvement upon some of the preceding ones. The revival in railroad business during the past year, and especially the extraordinary activity in car-building, should of itself give a new interest to these gatherings. But aside from this, the subjects which were placed in the hands of committees a year ago, and upon which reports are

expected to be made, embrace so many important matters of inquiry and investigation that no car-builder can be indifferent to them. The subject of uniformity in freight-car construction has assumed a practical phase. A positive movement, the result of absolute necessity, has been made in this direction, and will doubtless give rise to a good deal of earnest discussion to which car-builders and others will be eager to listen, if they do not feel inclined to participate in it.

The usual three days' session at these annual meetings is manifestly too short a time for a proper disposal of the business to be transacted. If the time occupied were six days instead of three, the work in hand would be better done and every member would go home better satisfied with the results. As it is, the work has to be subordinated to the time, and the discussions of many important topics are interrupted and closed just at the point where they are most interesting and profitable. A little more time, and a little less haste, would be a great advantage in a business point of view, to say nothing of the wider margin that would be afforded for the enjoyment of the hospitalities tendered to the members upon these occasions, and which it would be an apparent rudeness to decline. A continuous six days' session would, no doubt, be inconvenient for most of the members, both as regards expense and absence from their duties at home, but it would, in our judgment, be productive of much more thorough and satisfactory work at the annual meetings.

PRIVATE BRANDS OF TIN PLATE.

The *Metal Worker* has been showing up the impositions practiced upon the buyers and consumers of tin plate by means of the private brand system that has for some time been a recognized feature of the trade. So long as well-known makers' brands are relied upon as criterion of quality, the buyer is pretty sure to get what he bargains for; but when what purports to be a specific quality is put upon the market with the jobber's or dealer's private brand as the only guarantee to the purchaser, the article is as a rule found to be inferior; or in other words, the brand does not indicate the quality, and the buyer is cheated. This is about the upshot of the whole matter, the recital of which is spread over several closely printed columns. It is merely one of the tricks of trade, and a very stale and shabby one at that. A brand or mark is one thing, and the particular grade or quality of goods it stands for is quite another thing. Every thing depends upon the integrity of the brand as a sign of quality. If a lot of unscrupulous dealers in order to swell their profits brand things to suit their fancy, and with a view to present gain merely, and if buyers take the brand as it reads and no questions asked, somebody will get taken in to a dead certainty. If consumers find themselves overreached, it is not altogether the fault of the private brands, but is largely due to their own eagerness to get-first-class goods at second-class prices. So long as they do not or will not discriminate against private brands, they directly encourage the practice and the abuse to which it leads. Let car-builders and others who buy roofing plates be on their guard in this matter. Let them buy only well-established *bona fide* makers' brands, else they will be very likely to pay for and use a second or third grade of tin, supposing it to be a prime first-grade—what they stipulate and pay for, but do not get.

THE LIGHTING OF CARS WITH PAINT.

The latest scientific wonder is the discovery, by an English professor, of a luminous paint which absorbs day-light in the day-time, and gives it forth or radiates it in the night. It has been tried on a first-class carriage of the London Metropolitan Railway, and succeeded so well that passengers could easily recognize one another and even tell the time by their watches. Its illuminating power lasts, it is said, several hours; when the paint on being again exposed to day-light recovers its power by absorbing another charge of light to be again given out as before, and so on as long as the paint lasts, which is said to be as long as ordinary paint. It is not safe nowadays to ridicule new and extraordinary discoveries, however incredible they may seem to be. This luminous paint is doubtless a fact, and if so, we hope it is in the "infancy of its development," as the phrase goes. Something of the kind is very much wanted upon many of the way passenger trains that run to and from New York city. The new light might not be very brilliant; but if it enabled passengers to recognize each other and tell the time by their watches, even if the conductor could not see to read the tickets without his lantern, it would be something of a boon. It would supersede the lamps now used on these trains, and also save the expense of their first cost and maintenance. The paint itself might take the place of the fine and costly veneering and cabinet woods and work an important saving in that respect. The passengers would be comforted by the reflection that the light, however dim it might be, was fully up to the capabilities of the paint and equal in brilliancy at least to what they had before, with no delusive mockery of oil and gas, and the added peril from explosion and conflagration.

THE yearly meeting of the Master Mechanics' Association at Cleveland, was marked by no features of special interest. About the usual number of members was in attendance. The reports of committees were chiefly in reference to the construction and management of locomotives. An interesting paper on boiler construction was read by Mr. Johann, of the Wabash road, a synopsis of which will be found in our summary of the proceedings. Of the tenor and spirit of the discussions we can form but an imperfect idea from the meagre reports that have been published. For years past the committees have relied upon replies to circulars for information to enable them to make their reports. This plan has proved a failure, and especially so this year; and in order to remedy the evil a new system has been devised providing for the appointment of committees in a different way from what has been the practice heretofore. Under this system certain members of the association are to be requested to furnish information upon designated subjects for the use of the committees. If the information is forthcoming, good reports may be expected; if it is not forthcoming, the committees must do the best they can without it. The change, so far as we can see, is one of form merely, and leaves the work to be done in the vital matter of furnishing information, very much as it was before. It is a change, however, and it may be for the better. At all events, it can hardly be worse than the old plan in its practical working.

ON another page will be found detailed specifications of twenty Wagner sleeping-cars which are being built by the Gilbert & Bush Co., to run on the New York Central & Hudson River Railroad. The cost of these will be about $18,000 each. In their design, interior finish, furnishing and ornamentation, they will not be surpassed by any cars of their class, and will constitute an important addition to the passenger equipment of this line.

OUR full-page engravings, illustrating a power-brake for freight trains, manufactured by the American Standard Brake Co., of Boston, will attract the attention of railroad men. The practical working of this device and the tests to which it has been subjected, so far as we can judge from reports, indicate that in the essential requisites of efficiency and cheapness, it meets the want so widely felt of a freight power-brake. It is not, strictly speaking, a new device, the original design and construction having been perfected and improved by the inventors until the apparatus is now considered complete.

SENATOR SHARON, of Nevada, the great silver mining satrap, has a private traveling-car built and furnished without the least regard to expense. It was built at the Pullman shops in Detroit, and is a miracle of convenience and comfort. It is constructed of rare woods, whose beauty of quality and grain have been brought out by oil, polishing and shellac. There are mirrors and hanging bookshelves. The evening card-table is the breakfast and dinner table of the day-time. The upholstery is bronze leather, fastened with silver-headed nails. There is hot and cold water in the bath-room; the seats are converted into luxurious beds at night, and partitions envelop them with all the privacy of sleeping apartments, produced like magic from nowhere.

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Atchison & Nebraska.—Col. L. W. Towne has resigned the position of General Superintendent to take the same office on the Kansas City, Fort Scott & Gulf, and Kansas City, Lawrence & Southern.

Atchison, Topeka & Santa Fe.—Mr. Geo. B. Lake, Superintendent of Western Division, has resigned, and Mr. W. W. Borst, formerly of the Denver & Rio Grande, has been appointed in his place.

Chicago & Alton.—Mr. Wm. Wilson has been appointed Superintendent of Machinery in place of A. A. Ackerly, resigned. Mr. Wilson has of late been the Master Mechanic of the Ohio & Indiana Division of the Wabash, St. Louis & Pacific.

Galena & Wisconsin.—This road has passed under the control of the Chicago & Northwestern. Mr. J. B. Trull has been appointed Superintendent, with office at Galena, Ill.

Greenville & Columbia.—Mr. J. W. Fry is appointed General Superintendent, in place of R. H. Temple, now Chief Engineer of the Richmond & Allegheny road.

Houston, East & West Texas.—Mr. E. Hulbert has retired from the position of Superintendent to which he was recently appointed.

Indianapolis & Vincennes.—Mr. Jas. J. Turner has been appointed Superintendent, in place of E. W. McKenna, resigned.

Jeffersonville, Madison & Indianapolis.—Mr. E. W. McKenna has been appointed Superintendent, in place of J. R. Shaler, resigned. Mr. McKenna has been for several years Superintendent of the Indianapolis & Vincennes road.

Manhattan Beach.—This company is successor to the New York & Manhattan Beach. The officers are: President, Austin Corbin; Vice-President, J. B. Upham; Treasurer, G. S. Moulton.

Missouri Pacific.—Mr. Warder Cumming has been appointed Superintendent of Western Division, vice H. Hale, resigned.

New York & Harlem.—Mr. Wm. M. Strong has resigned as Superintendent of Motive Power, and Mr. Wm. Buchanan, of the Hudson River Division of the New York Central, will assume charge of the Harlem Division, assisted by Mr. Theodore Wheeler, who has been appointed Master Mechanic.

New York, Pennsylvania & Ohio.—The office of Wm. Fuller, General Master Mechanic, has been removed from Meadville, Pa. to Cleveland, Ohio.

Pennsylvania.—Mr. Thomas A. Roberts has been appointed Superintendent of the Bedford Division, in place of Persifer F. Smith, resigned.

Portland & Rochester.—Mr. James M. Lunt has resigned as Superintendent. He has held the position for several years.

Southern Minnesota.—This road is now run as a division of the Chicago, Milwaukee & St. Paul. Mr. J. M. Egan continues as Superintendent, a position he has held for several years under the old management.

Directory of Master-Mechanics and Master Car-Builders

THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—* Mechanical Engineer. † Mechanical Superintendent. ‡ General Master Mechanic. †† Gen. Master Car-Builder. § Master of Machinery. ‖ General Foreman. ** Supt. of Machinery. §§ Supt. of Motive Power and Machinery. ‡‡ Supt. Cars and Buildings. ¶ Supt. of Equipment. ¶¶ Ass't Supt. of Equipment.

A

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Adirondack	Jacob Myers	James J. Traver	Saratoga, N. Y.
Alabama Central	Simon Gay	James Owens	Selma, Ala.
Alabama Great Southern	§§John McVey		Chattanooga, Tenn.
Albany & Susquehanna	§§R. C. Blackall	R. C. Blackall	Albany, N. Y.
Albany & Susquehanna	C. A. Jones	J. Skinner	Oneonta, N. Y.
Arkansas Midland	J. B. Johnson	J. B. Johnson	Helena, Ark.
Ashtabula & Pittsburg	Geo. J. Parkins	Wm. Marquis	Allegheny City, Pa.
Atchison, Topeka & Santa Fe	§§Geo. Hackney	Geo. Hackney	Topeka, Kan.
Western Division	A. C. Stiles		Pueblo, Col.
Atchison & Nebraska	V. D. Volk	T. A. H. Berkey	Atchison, Kan.
Allegheny Valley	G. W. Glass	R. Gunning	Pittsburgh, Pa.
Atlanta & Charlotte Air-Line	C. D. Wall	C. D. Wall	Atlanta, Ga.
Atlanta & West-Point	Wm. Rushton		Atlanta, Ga.
Atlanta & West-Point		R. D. Cole	Newnan, Ga.
Atlantic & North Carolina	Basil Manly		New Berne, N. C.
Atlantic, Mississippi & Ohio			
Norfolk & Peter Division	J. T. Robinett	J. T. Robinett	Petersburg, Va.
Virginia & Tenn. Division	F. Sterk	W. A. Morgan	Lynchburg, Va.
Western Division	A. C. Stiles		Pueblo, Col.

B

Baltimore & Ohio	§John C. Davis	J. S. Shryack	Baltimore, Md.
Baltimore & Ohio	A. J. Cromwell	James H. Mill	Baltimore, Md.
Baltimore & Ohio	Wm. Edwards		Martinsburg, Va.
Baltimore & Ohio	I. N. Kalbaugh		Piedmont, Va.
Baltimore & Ohio	E. L. Weigerber		Grafton, W. Va.
Baltimore & Ohio	Robert Maxwell		Cumberland, Md.
Baltimore & Ohio	Chas. Hirsch		Wheeling, W. Va.
Baltimore & Ohio	S. B. Crawford		Parkersb'rg, W. Va.
Central Ohio Division	O. B. Perkins		Zanesville, O.
Ohio & Chicago Division	§Sam. Houston		Newark, O.
Central Ohio Division	James Stewart		Newark, O.
Central Ohio Division	H. M. Ingler		Bellaire, O.
Lake Erie Division	And. Beckert		Sandusky, O.
Chicago Division	W. Y. Johnston		Garrett, Ind.
Chicago Division	F. J. Gunther		Chicago June., O.
Chicago Division	Geo. Wilson		Kingston, Ill.
Pittsburg Division	John E. Sampsel		Connellsville, Pa.
Baltimore & Potomac	§§R. H. Soule		Baltimore, Md.
Bath & Hammondsport	S. S. Reynolds		Ham'ondsp't, N. Y.
Bedford, Springville, O. & Bloom'd	Capt. Geo. Elliott		Bedford, Ind.
Bellefonte & Snow-Shoe	H. D. Landis	H. D. Landis	Bellefonte, Pa.
Bennington & Rutland	G. W. Blanchard		Rutland, Vt.
Boston & Albany	Wilson Eddy		Springfield, Mass.
Boston & Albany	A. B. Underhill		Boston, Mass.
Boston & Albany		F. D. Adams	Allston, Mass.
Boston & Albany	T. B. Purvis		Greenbush, N. Y.
Boston & Albany		J. E. Doran	E. Albany, N. Y.
Boston & Providence	George Richards	John Lightner	Roxbury, Mass.
Boston, Barre & Gardner	Chas. F. Brigham		Worcester, Mass.
Boston, Concord & Montreal	Ralph Adams	L. D. Pickering	Lake Village, N. H.
Boston & Maine	Wm. Smith		Boston, Mass.
Boston & Maine		D. C. Richardson	Lawrence, Mass.
Boston & Lowell	J. F. Crockett	J. F. Crockett	Boston, Mass.
Boston & New York Air-Line			New Haven, Conn.
Boston, Revere Beach & Lynn	J. L. Folsom	John Coghlan	Boston, Mass.
Brunswick & Albany	M. Thornton		Brunswick, Ga.
Burlington & Missouri River in Neb.	D. Hawksworth	D. Hawksworth	Flattsmouth, Neb.
Burlington, Cedar Rapids & Nor.	R. W. Bushnell		Cedar Rapids, Ia.
Burlington & Southwestern		A. B. Allen	Farmington, Ia.
Buffalo & Southwestern	J. G. Hubbard		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Allen Vail		Buffalo, N. Y.

C

Cairo & St. Louis	**G. B. Simonds	G. B. Simonds	E. Carondelet, Ill.
Cairo & Vincennes	A. Van Tuyl	A. Van Tuyl	Carmi, Ill.
Californi a, Pacific & Northern	D. Rutherford	D. Rutherford	So. Vallejo, Cal.
Camden & Atlantic	Rufus Hill	S. Wills	Camden, N. J.
Canada Central	H. J. Marshall		Brockville, Can.
Canada Southern and Branches	†John Ortton	John Ortton	St. Thomas, Ont.
Canada Division	W. A. Short		St. Thomas, Ont.
U. S. Division	O. P. Dunbar		Grosse Isle, Mich.
Carolina Central	§Jas. Maghan	S. R. Ethridge	Laurinburg, N. C.
Catasauqua & Foglesville	Tho. E. Evans	Chas. J. Holbach	Catasauqua, Pa.
Central of Georgia	D. D. Arden	C. C. Millar	Savannah, Ga.
Atlanta Division	D. M. Ray	Jas. A. Knight	Macon, Ga.
Central of New Jersey	Wm. Woodcock	George Hackett	Elizabeth, N. J.
Lehigh & Susquehanna Div.	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Central of Iowa	M. G. Wheeler	T. L. Seevers	Marshalltown, Ia.
Central Pacific	‡A. J. Steves	††Benj. Welch	Sacramento, Cal.
Western Division	Geo. D. Welch	W. B. Ludlow	Oakland, Cal.
Central Pacific		‡G. J. Turner	Sacramento, Cal.
Visalia Division	S. Johnson		Tulare, Cal.
Sacramento & Oregon Div.	M. W. Cooley	Phil. Douglass	Sacramento, Cal.
Truckee Division	Geo. Gregg	Wm. McPherson	Wadsworth, Nev.
Humboldt Division	W. F. Smith	J. C. Doughty	Carlin, Nev.
Salt Lake Division	Jas. Lamb		Terrace, Utah.
Salt Lake Division		‡A. Sherburne	Ogden, Utah.
Central Vermont	§§J. M. Foss		St. Albans, Vt.
New London & Northern Div.	I. W. Dow	S. O. Banks	New London, Conn.
Rutland Division	N. L. Davis	N. L. Davis	Rutland, Vt.
Chesapeake & Ohio	§John McFarland	J. N. King	Richmond, Va.
Chesapeake & Ohio	Tho. L. Chapman	H. C. Bassinger	Huntingdon, W. Va.
Cherawa & Darlington	John Bissett	W. H. Day	Florence, S. C.
Cherokee	P. J. Bracken		Cedartown, Ga.
Cheshire	F. A. Perry	‡A. E. Howard	Keene, N. H.
Chepaug	C. M. Allen	C. M. Allen	Litchfield, Conn.
Charlotte, Columbia & Augusta		J. C. Troeger	Columbia, S. C.
Chicago & Pacific	James Penny	C. N. Code	Chicago, Ill.
Chicago & Northwestern	** Geo. W. Tilton	††William Campbell	Chicago, Ill.
Wis., Mad. & Mill. Divis.			Chicago, Ill.
Galena Division			Chicago, Ill.
Iowa Division	J. O. Chapman	H. L. Preston	Clinton, Ia.
Peninsula Division	Geo. White		Escanaba, Mich.
Winona & St. Peters Div.	W. A. Scott	W. A. Scott	Winona, Minn.
Chicago & Alton	§§Wm. Wilson		Bloomington, Ill.
Chicago, Burlington & Quincy	§§H. B. Stone	*J. Chistiansen	Aurora, Ill.
Galesburg Division	Robert Colville		Galesburg, Ill.
Iowa Division	Joel West		Burlington, Ia.
Iowa Division	C. W. Eckerson		Creston, Ia.
St. Louis Division	H. Whiting		Beardstown, Ill.
Chicago & Springfield	W. B. McKenna		Clinton, Ill.
Chicago, Clinton, Dubuque & Minn.	E. Smedley	E. Smedley	Dubuque, Ia.
Chicago, Rock Island & Pacific	‡T. P. Twombly	B. K. Verbryck	Chicago, Ill.
Keokuk & Des Moines Div.	S. W. Wakefield	Henry Kummer	Keokuk, Iowa.
Southwestern Division	R. O. Carscadin		Trenton, Mo.
Chicago & West Michigan	Russell Booth		Muskegon, Mich.
Chicago & Eastern Illinois	Allen Cooke	Allen Cooke	Danville, Ill.
Chicago & Iowa	H. S. Bryan		Aurora, Ill.
Chicago & Grand Trunk	†K. Blackwell	Geo. W. Prescott	Battle Creek, Mich.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Chicago, Milwaukee & St. Paul	J. M. Lowry		Milwaukee, Wis.
La Crosse & P. Du Ch. Div.		John Bailie	Milwaukee, Wis.
Northern Division		Wm. E. Kittredge	Milwaukee, Wis.
Iowa & Minn. Division	J. O. Pattie		Minneapolis, Minn.
Racine & S. West Div.	John Taylor	E. A. Eddy	Racine, Wis.
Sioux City & Dak. Div.	J. H. Moulton		Yankton, Dak.
Southern Minnesota Div.	J. B. Henney	J. B. Henney	Hokah, Minn.
Chicago & Paducah	T. J. Grosh	T. J. Grosh	Streator, Ill.
Chicago, Pekin & Southwestern	A. R. Overton		Joliet, Ill.
Chicago, Pekin & Southwestern		F. Shields	Streator, Ill.
Chicago, St. Louis & New Orleans	**W. H. Purdy		McComb C'y, Miss.
Chicago, St. Louis & New Orleans	E. D. Anderson		McComb C'y, Miss.
Chicago, St. Louis & New Orleans	J. M. Keith		Jackson, Tenn.
Chicago, St. Louis & New Orleans	J. F. White		Water Valley, Miss.
Chicago, St. Paul & Minneapolis	Matt Ellis	J. C. Fischer	Hudson, Wis.
Cincinnati, Wabash & Michigan	S. B. Tinker	S. B. Tinker	Wabash, Ind.
Cincinnati, Hamilton & Dayton	James Eckford	W. H. H. Allison	Cincinnati, O.
Indianapolis Division	Edward Moore		Indianapolis, Ind.
Cincinnati, Lafayette & Chicago	J. B. Morgan	J. B. Morgan	Lafayette, Ind.
Cincinnati, Richmond & Chicago	Wesley S. Brewer		Richmond, Ind.
Cin. Rockport & So. Western	B. W. Smith	J. H. Bauman	Rockport, Ind.
Cincinnati, Sandusky & Cleveland	B. J. Gregg		Sandusky, O.
Cincinnati Southern	Tho. Price	Geo. Butler	Cincinnati, O.
Cleve., Col., Cin. & Indianapolis	‡L. S. Young	††L. S. Young	Cleveland, O.
Indianapolis Division	A. R. McAlpine		Brightwood, Ind.
Columbus & Cin. Division	F. G. Kaufhoiz	Wm. Cleave	Cleveland, O.
Cleveland & Pittsburg	N. E. Chapman	[A. St'nbrunner	Cleveland, O.
Cleve., Mt. Vernon & Columbus	J. W. Holloway	J. W. Holloway	Akron, O.
Cleve., Tusc. Valley & Wheeling	W. F. Turreff	Geo. H. Pratt	Black River, O.
Cobourg, Peterboro & Marmora	Wm. Polson		Cobourg, Canada.
Columbus & Hocking Valley	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Columbus & Toledo	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Concord	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Portsmouth	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Claremont	**J. N. Lauder		Concord, N. H.
Connecticut River	‖W. H. Stearns	R. Hitchcock	Springfield, Mass.
Connecticut Valley	S. E. Brewer	S. E. Brewer	Hartford, Conn.
Connecticut Western	John C. Barton		Hartford, Conn.
Conn. & Passumpsic Rivers	John R. Hubbard		Lyndonville, Vt.
Corning, Cowanesque & Antrim	O. J. Patchell	O. C. Patchell	Corning, N. Y.
Cumberland Valley	A. S. Hull	G. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	N. W. Howson	Nathan Binnix	Mt. Savage, Md.

D

Dak. So. & Sioux City & Pembina	J. H. Moulton	J. H. Moulton	Yankton, Dak.
Danbury & Norwalk	N. M. George	N. M. George	Danbury, Conn.
Danville & Southwestern	B. L. Baldwin		Danville, Ill.
Davenport & Northwestern	H. E. Woods		Davenport, Ia.
Dayton & Union	H. S. Gordon	H. S. Gordon	Dayton, O.
Dayton & Southeastern	Wm. E. Cooper		Dayton, O.
Dayton & Michigan	John Black		Lima, O.
Delaware, Lackawanna & West	Walter Dawson	Robert McKenna	Scranton, Pa.
Morris & Essex Division	W. H. Lewis		Kingsland, N. J.
Morris & Essex Division		J. W. Baker	Dover, N. J.
Oswego & Syracuse Division	James Buchanan		Syracuse, N. Y.
Utica, Chenango & Susq. Div.	Tho. Thatcher		Utica, N. Y.
Bloomsburg Division	Charles Graham		Kingston, Pa.
Delaware & Chesapeake	Jos. A. Baynard		Easton, Md.
Delaware & Hudson Canal Co	**R. C. Blackall		Albany, N. Y.
Delaware & Hudson Canal Co		T. Orchard	Carbondale, Pa.
Rensselaer & Saratoga Div.	J. L. Corey	John Wicks	Green Island, N. Y.
Denver Pacific	§R. McDougall	John Clock	Denver, Col.
Denver & Rio Grande	N. W. Sample	N. W. Sample	Denver, Col.
Denver, South Park & Pacific	James Kirk	James Kirk	Denver, Col.
Des Moines & Fort Dodge	John McGrayel	R. Merrill	Grand Junction, Ia.
Detroit & Bay City	R. P. Baillie		Bay City, Mich.
Detroit, Grand Haven & Mil.	Fred Parker		Detroit, Mich.
Detroit, Lansing & Northern	G. C. Watrous	G. C. Watrous	Ionia, Mich.
Dorchester & Delaware			Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts	J. C. Haggett	J. C. Haggett	Dunkirk, N. Y.

E

East Broad Top	Wm. C. Maynes		Orbisonia, Pa.
Eastern			East Boston, Mass.
Eastern Kentucky	D. L. Weaver	D. L. Weaver	Riverton, Ky.
E. Tennessee, Virginia & Georgia	C. A. Hodge	Joseph Armbruster	Knoxville, Tenn.
Erie & Pittsburg	J. N. Wood	J. N. Wood	Erie, Pa.
Eureka & Palisade	J. M. Alson		Eureka, Nev.
European & North Am. (of Maine)	A. O. Bailey	A. O. Bailey	Mattawanke'g, Me.
Evansville & Terre Haute	John L. White	Joseph. Stiker	Evansville, Ind.
Evansville, Terre Haute & Chic	§§W. D. Macfarlane		Terre Haute, Ind.

F

Fitchburg	§Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Fort Vermont & Mass. Div.	W. A. Foster	Jacob Marsh	Fitchburg, Mass.
Flint & Pere Marquette	T. J. Ratswell	T. J. Ratswell	E. Saginaw, Mich.
Florida, Central	James S. McElroy	James S. McElroy	Jacksonville, Fla.
Flushing, North Shore & Central	Thomas Meehan	[Edward Riley	L. I. City, N. Y.
Fort Wayne & Jackson	Wm. Hollister		Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	Wm. McPhail	Wm. McPhail	Fort Wayne, Ind.

G

Galv., Harrisburg & San Antonio	D. T. Davis		Harrisburg, Tex.
Galveston, Houston & Henderson	R. B. Small		Galveston, Tex.
Geneva, Ithaca & Sayre	J. N. Weaver		Waverly, N. Y.
Geneva, Ithaca & Sayre		E. R. Brown	Packerton, Pa.
Georgia	John S. Cook	T. M. Preval	Augusta, Ga.
Grand Haven	A. S. Parish		Allegan, Mich.
Grand Tower & Carbondale	Hugh Smith	Hugh Smith	Grand Tower, Ill.
Grand Trunk	†Herbert Wallis	Wm. McWood	Montreal, Canada.
Grand Trunk	[Warren Noyes		Gorham, N. H.
Grand Trunk		[Duncan Menish	Portland, Me.
Grand Rapids & Indiana	J. M. Boon		Fort Wayne, Ind.
Grand Rapids & Indiana	J. R. Fish	J. R. Fish	Grad Rapids, Mich.
Grayville & Mattoon	C. H. Cory		Mattoon, Ill.
Great Western, of Canada	†C. K. Domville		Hamilton, Can.
Great Western, of Canada	C. F. Hanson	Henry Childs	London, Ont.
Green Bay & Minnesota	[Edw. Osborne		Green Bay, Wis.
Greenville & Columbia	W. J. Parrish		Helena, S. C.

H

Hanover Junction & Gettysburg	John J. Bingley	Henry Britcher	Hanover, Pa.
Hannibal & St. Joseph	Tho. G. Gorman	Tho. G. Gorman	Hannibal, Mo.
Housatonic	N. Slingland	J. J. Ferris	Falls Village, Conn.
Houston, East & West Texas	J. E. Wiggin		Houston, Tex.
Houston & Texas Central	L. C. Noble	James McGee	Houston, Tex.
Huntingdon & Broad Top	Wm. Barkla		Saxton, Pa.

I

Illinois Central	**S. J. Hayes	W. B. Snow	Chicago, Ill.
Chicago Division	Henry Schlacks		Chicago, Ill.
South Division	David Oxley		Centralia, Ill.
North Division	J. R. Edams		Amboy, Ill.
Iowa Division	Thomas W. Place		Waterloo, Ia.
Springfield Division	W. B. McKenna		Clinton, Ill.
Illinois Midland	H. H. Osborn		Paris, Ill.
Illinois & St. Louis	J. H. Smith		Belleville, Ill.
Illinois & St. Louis		Charles Rothe	E. St. Louis, Ill.
Indianapolis, Cin. & Lafayette	J. S. Patterson	J. S. Patterson	Cincinnati, O.
Indianapolis, Decatur & Springfield	Pulaski Leeds		Indianapolis, Ind.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Indianapolis & St. Louis	A. J. Sanborn	A. J. Sanborn	Mattoon, Ill.
Indiana, Bloomington & Western	C. A. Thompson	H. Ford	Urbana, Ill.
International & Great Northern	John G. Coulon	W. H. Martin	Palestine, Tex.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Intercolonial	†H. A. Whitney	Edw. Shaffer	Moncton, N. B.
Iron	Perry Scott	Clem. Roedling	Ironton, O.
J			
Jacksonville, Pensacola & Mobile	Jas. D. Hollister		Tallahassee, Fla.
Jeffersonville, Mad. & Indianapolis	Wm. Swanston	J. D. McIlwain	Jeffersonville, Ind.
Jacksonville, N. West. & S. East	B. J. Miller		Jacksonville, Ill.
Joplin	P. T. Butterly	P. T. Butterly	Girard, Kan.
Junction & Breakwater	J. A. Maguire		Lewes, Del.
K			
Kansas City, Ft. Scott & Gulf	W. D. Rowley		St. Joseph, Mo.
Kansas City, Fort Scott & Gulf	J. S. McCrum	A. N. Montier	Kansas City, Mo.
Kansas City, Lawrence & South'n	J. S. McCrum		Kansas City, Mo.
Kansas City & Eastern	J. H. Burnham	J. H. Burnham	Independence, Mo.
Kan. City, St. Jo. & Coun. Bluff	Wm. D. Rowley	Theo. Aylesbury	St. Joseph, Mo.
Kansas Central	Wm. McCall		Leavenworth, Kan.
Kansas Pacific	**John MacKenzie	T. B. Roberts	Armstrong, Kan.
Kaw Valley Division	James Long		Armstrong, Kan.
Smoky Hill Division	John H. Daily		Ellis, Kan.
Denver Division	R. McDougal	John Clock	Denver, Col.
Kentucky Central	J. R. Ledyard	J. L. Hackathorn	Covington, Ky.
Knox & Lincoln	E. Bolton	C. L. Turner	Bath, Me.
L			
Lake Erie & Western	**Everett Clemons		Fremont, Ohio.
Lake Erie & Western	¶H. L. Cooper		Lafayette, Ind.
Lake Ontario Southern	Geo. Thompson	Wm. Currier	Sodus Point, N. Y.
Lake Shore & Michigan Southern	James Sedgley	††John Kirby	Cleveland, Ohio.
Michigan Southern Division	Geo. W. Stevens		Elkhart, Ind.
		Frank O. Bray	Adrian, Mich.
Toledo Division	J. M. Sanborn	W. O. Smith	Norwalk, Ohio.
Erie Division	I. O. Gassett	J. Withycombe	Cleveland, Ohio.
Buffalo Division	Edward Studley	A. C. Robson	Buffalo, N. Y.
Lehigh Valley	John I. Kinsey		South Easton, Pa.
Lehigh Valley	P. Hofecker		Weatherly, Pa.
Lehigh Valley	John Campbell		Delano, Pa.
Lehigh Valley	D. Clark		Hazleton, Pa.
Lehigh Valley	A. Mitchell		Wilkesbarre, Pa.
Lehigh Valley		E. R. Brown	Manch Chunk, Pa.
Lehigh Valley		John S. Lentz	Packerton, Pa.
Little Rock & Fort Smith	James Eblin	James Malone	Argenta, Ark.
Little Rock, Miss. River & Texas	Joseph Taylor	Joseph Taylor	Arkans's City, Ark.
Los Angeles & Independence	Jas. Velsir	J. S. Young	Los Angeles, Cal
Louisville, New Albany & Chicago	Geo. Rohlandt	Geo. Rohlandt	New Albany Ind.
Long Island	††Thos. Meehan	Hugh Longest	L. Isl'd City, N. Y.
Louisville, Cincinnati & Lexing'n	A. Schaeffer	A. Schaeffer	Louisville, Ky.
Louisville & Nashville	**Reuben Wells		Louisville, Ky.
Louisville Division	D. P. Rennie		Nashville, Tenn.
Nashville & Decatur Div	E. M. Humstone	J. P. Furguson	Birmingham, Ala.
South & North Ala. Div	C. W. White		Memphis, Tenn.
Memphis & Ohio Div	Thos. Walsh		Bowling Green, Ky.
Clarksville Division	Wm. Adair		Nashville, Tenn.
Ev., Hen. & Nashville Div	E. M. Humstone		
M			
Macon & Brunswick	R. Wagnon	R. Wagnon	Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Maine Central		C. H. Kenison	Augusta, Me.
Manchester & Lawrence	J. T. Gordon	J. T. Gordon	Concord, N. H.
Manhattan Beach	Lewis James		Bay Ridge, L. I.
Manhattan Elevated	Allan Stirling		New York, N. Y.
Marietta, Pittsburg & Cleveland	Thos. Robertson		Marietta, Ohio.
Marietta & Cincinnati	E. M. Bosley	E. M. Bosley	Chillicothe, Ohio.
Marquette, Houghton & Onton'gn	W. H. Williams	H. D. Lyons	Marquette, Mich.
Memphis, Paducah & Northern	G. M. Taylor	G. M. Taylor	Paducah, Ky.
Memphis & Little Rock	Tho. Rennell	P. Twitchell	Argenta, Ark.
Memphis & Charleston	§H. N. Burford	J. J. Kasey	Memphis, Tenn.
Michigan Central	S. H. Edgerly		Jackson, Mich.
Michigan Central		††Robert Miller	Detroit, Mich.
Milwaukee, Lake Shore & West'n	S. Charnly		Manitowoc, Wis.
Minneapolis & St. Louis	Tho. Downing	Tho. Downing	Minneapolis, Minn.
Mineral Point	Robert Hay	Robert Hay	Mineral Pt., Wis.
Mineral Range	George F. Coon		Hancock, Mich.
Mississippi & Tennessee	Geo. Hasginger	S. J. Bolton	Memphis, Tenn.
Missouri & Western	A. C. Persing		Pierce City, Mo.
Missouri, Iowa & Nebraska	J. G. Crozier		Alexandria, Mo.
Missouri, Kansas & Texas	H. H. Alexander		Dennison, Texas.
Missouri, Kansas & Texas	**J. W. Cushing	John C. Barber	Sedalia, Mo.
Missouri, Kansas & Texas	Wm. T. Small		Parsons, Kan.
Missouri Pacific	§§John Hewitt	John Hodge	St. Louis, Mo.
Missouri Pacific	R. D. Grant		St. Louis, Mo.
Missouri Pacific	Geo. W. Walshe		Sedalia, Mo.
Missouri Pacific	H. V. Faries		Atchison, Kan.
Mobile & Montgomery	W. H. Thomas	Lewis Barham	Montgomery, Ala.
Mobile & Girard	J. C. Albrecht	A. J. Nix	Columbus, Ga.
Mobile & Ohio	R. H. Briggs	J. T. Booth	Whistler, Ala.
Mobile & Ohio	John Fitzgerald		Macon, Miss.
Mobile & Ohio	M. T. Carson		Jackson, Tenn.
Montgomery & Eufaula	D. M. Gugel	James A. Knight	Macon, Ga.
Morgan's Louisiana & Texas	N. Tilton	Wm. O'Brien	Algiers, La.
N			
Nashua & Lowell	S. A. Davis	S. A. Davis	Nashua, N. H.
Nashville, Chattan'ga & St. Louis	James Cullen	J. G. Sawyer	Nashville, Tenn.
St. Louis Division	L. B. Salisbury	W. H. H. Price	Mt. Vernon, Ill.
	Henry Hanford	George W. Gray	Bridgeport, O.
Naugatuck	D. Hawksworth		Plattsmouth, Neb.
Nebraska			Dutchess J'n, N. Y.
Newburg, Dutchess & Connecticut	W. J. Vanbuskirk		Fredericton, N. B.
New Brunswick	P. A. Logan	P. A. Logan	St. Andrew's, N. B.
New Brunswick & Canada	Tho. Armstrong	G. Houlton	New Haven, Ct.
New Haven & Northampton	Henry Fox	John Sweeny	Wortendyke, N. J.
New Jersey Midland	W. C. Ennis		Jersey City, N. J.
New Jersey & New York	J. S. Drake		Manchester, N. J.
New Jersey Southern	Rufus Blodgett		Mobile, Ala.
New Orleans & Mobile	§Josiah Bettis		Susquehanna, Pa.
New York, Lake Erie & Western	§§F. M. Wilder		Jersey City, N. J.
New York, Lake Erie & Western	J. H. Vreeland		Jersey City, N. J.
New York, Lake Erie & Western		J. N. Milebam	Port Jervis, N. Y.
New York, Lake Erie & Western	J. Van Vechten	J. Van Vechten	Susquehanna, Pa.
New York, Lake Erie & Western	V. Blackburn		Elmira, N. Y.
New York, Lake Erie & Western		D. B Goodell	Hornellsville, N. Y.
New York, Lake Erie & Western	George H. Griggs		E. Buffalo, N. Y.
New York, Lake Erie & Western	Tho. West	M. Wilder	Rochester, N. Y.
New York, Lake Erie & Western	Jos. Bradt		New York, N. Y.
New York & Harlem	Theo. Wheeler		Morrisania, N. Y.
New York & Harlem		C. E. Garey	New York, N. Y.
New York Central & Hud. River		††Leander Garey	West Albany, N. Y.
New York Central Division	§§G. B. Van Vorst	D. Holt	Syracuse, N. Y.
New York Central Division	§§Henry Watkeys		E. Buffalo, N. Y.
New York Central Division	§§Amos Gould		Niagara Falls, N. Y.
New York Central Division	§§S. L. White	Richard Donaby	E. Buffalo, N. Y.
New York Central Division		E. A. Olmstead	New York, N. Y.
Hudson River Division	§§Wm. Buchanan	Peter Smith	E. Rochester, N. Y.
New York Central Division		W. B. White	Rochester, N. Y.
New York Central Division		Geo. Cummings	Middletown, N. Y.
New York, Ontario & Western	Edw. Minshull		Boston, Mass.
New York & New England	§§Geo. E. Boyden	Elias E. Pratt	Norwich, Ct.
Norwich & Worcester Div	Richard Colburn	John W. Marden	New Haven, Ct.
New York, N. Haven & Hartford	§§H. Kettendorf	James Denver	Hartford, Ct.
Hartford Division	§§Jno. Henney, Jr.	L. Packard	Cleveland, O.
New York, Penn. & Ohio	‡William Fuller		Meadville, Pa.
New York, Penn. & Ohio		††J. H. F. Wiers	Meadville, Pa.
New York, Penn. & Ohio	J. A. Cooper	D. S. Dockstader	Meadville, Pa.

Railroad	*Master-Mechanic.*	*Master Car-Builder.*	*Residence*
New York, Penn. & Ohio	N. Wright	W. G. Huggard	Cleveland, O.
New York, Penn. & Ohio		S. Y. Smith	Kent, O.
New York, Penn. & Ohio	William Hill	J. W. Holmes	Galion, O.
New York, Penn. & Ohio		J. T. Fosdick	Salamanca, N. Y.
New York, Penn. & Ohio		Geo. Wilson	Dayton, O.
New York, Penn. & Ohio	§§R. H. Soule	G. W. Demarest	Baltimore, Md.
Northern Central	J. M. Coale		Baltimore, Md.
Northern Central	James Strode	J. C. Dyott	Elmira, N. Y.
Northern Central	**Jas. N. Lauder		Concord, N. H.
Northern New Hampshire	Peter Clark	Peter Clark	Toronto, Can.
Northern of Canada	**A. P. Farrar	A. P. Farrar	Brainerd, Minn.
Northern Pacific			Fargo, Dak.
Dakota Division	A. Rupert	Tho. G. Davis	New Tacoma, W. T.
Pacific & P. Oreille Div	C. Z. Sanders	W. H. Day	Florence, S. C.
Northeastern			Sancelito, Cal.
North Pacific Coast	James Walch		
O			
Ogdensburg & Lake Champlain	Abraham Klohs		Malone, N. Y.
Ohio & Mississipi	‡J. F. Sechler		Vincennes, Ind.
Ohio & Mississippi		J. P. Coulter	Aurora, Ind.
Cincinnati Division	John Thumser		Seymour, Ind.
St. Louis Division	J. B. Wilson		Vincennes, Ind
Springfield Division	E. K. Sechler		Pana, Ill.
Old Colony	J. K. Taylor	A. Gleason	Boston, Mass.
R. C. F. & N. Bedford Div	Geo. W. Reynolds	Sam. E. Stevens	Taunton, Mass.
Oregon & California	§§J. Brandt		Portland, Oregon
Oregon Rail'ay & Navigation Co	J. F. Curtis		Dalles, Oregon.
P			
Paducah & Elizabethtown	W. D. Robb	W. D. Robb	Elizabethtown, Ky.
Painesville & Youngstown	J. H. Jones		Painesville, O.
Panama	Thos. S. O'Brien		Aspinwall, U. S. C.
Parker & Karns City	Philip Davies	Wm. Wolford	Parker City, Pa.
Pensacola	R. G. Nichol		Pensacola, Fla.
Pensacola & Selma	R. H. Kelly		Selma, Ala.
Pennsylvania	§§T. N. Ely		Altoona, Pa.
Pennsylvania	H. D. Garrett	J. W. Van Houten	W Philadelphia, Pa
Pennsylvania	E. L. Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Strattan	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	J. G. Stewart	Pittsburg, Pa.
Pennsylvania	L. A. Boadevex	E. F. Bosdevex	Meadow Shops, N. J.
New Jersey Division		David H. Baker	Jersey City, N. J.
New Jersey Division	§§H. S. Hayward		Jersey City, N. J.
New Jersey Division	Tho. Kerr	P. S. Bogart	So. Amboy, N. J.
New Jersey Division	R. McDowell		Lambertville, N. J.
New Jersey Division	W. McAlister		Camden, N. J.
New Jersey Division	C. B. Street	M. H. Falls	Blairsville, Pa.
West Penn. Division	Isaac Adams		Pekin, Ill.
Peoria, Decatur & Evansville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peoria, Pekin & Jacksonville	E. Deizerdt	E. Deizerdt	Peoria, Ill.
Peoria & Springfield	R. B. Andrews	J. W. Fleming	Petersburg, Va.
Petersburg	R. B. Andrews	Wm. Lungren	Wilmington, Del.
Philadelphia, Wilmington & Balt	S. A. Hodgman	E. Lippincott	Camden, N. J.
Philadelphia & Atlantic City	J. W. Wright		Williamsport, Pa.
	§§Howard Fry		Sunbury, Pa.
	W. F. Beardsley		Renovo, Pa.
Philadelphia & Erie	W. L. Forster		Kane, Pa.
	W. L. Holman		Erie, Pa.
	W. T. Smith		Chester, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	S. D. Danfield	Reading, Pa.
Philadelphia & Reading	L. B. Paxson	John H. Rankin	Catawissa, Pa.
Catawissa Branch	W. H. Ellis	C. D. Ellis	Philadelphia, Pa.
Germantown & Norris'n Div	Jackson Richards		Philadelphia, Pa.
North Penn. Division	Jackson Richards	C. W. Hammann	Philadelphia, Pa.
Del. & Bound Brook Div	Jackson Richards		Richford, Vt.
Southeastern (Canada)	Edwin Goss		Richmond, Va.
Piedmont Air Line	†R. D. Wade		Richmond, Va.
Rich. & Danville Div		J. B. Vaughan	Comb Shops, N. C.
North Carolina Div		J. C. Holt	Columbus, O.
Pittsburg, Cincinnati & St. Louis	§§G. W. Rhodes	John McVay	Cincinnati, O.
Little Miami Division	J. H. Setchel	M. P. Ford	Columbus, O.
Little Miami Division		Tho. Chamberlin	Columbus, O.
Col., Cin. & Ind. Division	Robert Curtis	Chas. H. Starr	Logansport, Ind.
Col., Cin. & Ind. Div	Geo. H. Prescott		Indianapolis, Ind.
Col. Cin. & Ind. Division	C. M. St. Clair	Daniel Jewell	Lancaster, O
Cin. & Musk. Val. Division	Leroy Kells		Penjson, O.
Pitts. Cin. & St. Louis Divis'n	Ross Kells	A. K. Mansfield	Steubenvill, O.
Pitts. Cin. & St. Louis Divis'n		John Yarquis	Allegheny, Pa.
Pittsburg, Fort Wayne & Chicago	Geo. Parkin	Israel Lee	Fort Wayne, Ind.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	J. J. Kirkland	Crestline, O.
Pittsburg, Fort Wayne & Chicago			Oil City, Pa.
Pittsburg, Titusville & Buffalo	H. J. Bookhammer	John Menks	Pittsburg, Pa.
Pittsburg, Virginia & Charleston	Wm. Lininger		Pittsburg, Pa.
Pittsburg & Lake Erie	S. W. Haines		Portland, Me.
Portland & Ogdensburg	Geo. H. Poor	W. G. Brewer	Portland, Me.
Portland & Rochester	E. H. C Tompson	David Dow	Woodside, Ont.
Port Dover & Lake Huron	H. M. Aldrich	J. H. Milton	Port Royal, S. C.
Port Royal & Augusta	Geo. Riley		Poughkeepsie, N. Y.
Poughkeepsie, Hartford & Boston	John L. Driscoll	D. M. Fraser	Charlotte'n, N. Y.
Prince Edward Island	A. Stronach		Pascoag, R. I.
Providence & Springfield	G. T. Richardson	A. Griggs	Providence, R. I.
Providence & Worcester	A. Griggs	J. Brightman	Bristol, R. I.
Providence, Warren & Bristol	Rufus Smith		
Q			
Quebec, Mont., Ottawa & Occidental	†A. Davis		Montreal, Can.
Quincy, Missouri & Pacific			Kirksville, Mo.
R			
Raleigh & Augusta Air-Line	**B. R. Harding	B. R. Harding	Raleigh, N. C.
Raleigh & Gaston	**B. R. Harding		Raleigh, N. C.
Rhinebeck & Connecticut	A. W. Quackenbush	John H. Decker	Rondout, N. Y.
Rich., Fredericksburg & Potomac	H. Khun	W. H. Trainham	Richmond, Va.
Richmond & Danville	See Piedmont Air-Line.		
Richmond & Petersburg	John O'Brien	H. L. Carter	Richmond, Va.
Richmond, York River & Chesapeake	A. B. Armstrong	A. B. Armstrong	Richmond, Va.
Rio Grande	G. W. Rendall	M. Markwood	Brownsville, Tex.
Rochester & State Line	A. J. Robbins		Rochester, N. Y.
Rock Island & Peoria	Joseph Elder		Peoria, Ill.
Rome, Watertown & Ogdensburg	Wm. H. Harris	Wm. H. Harris	Oswego, N. Y.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
S			
Saginaw Valley & St. Louis		H. C. Whiting	St. Louis, Mich.
San Francisco & Northern Pacific	Ed. Reynolds	J. D. Murphy	Donahue, Cal.
Savannah & Charleston	H. A. Ulmo	P. N. Raynal	Charleston, S. C.
Savannah, Florida & Western	§Charles Collins		Savannah, Ga.
Savannah & Memphis	R. A. Bridges	C. H. Cory	Opelika, Ala.
Scioto Valley	C. H. Cory		Portsmouth, O.
Seaboard & Roanoke	§§M. M. Pendleton	W. W. Pierce	Portsmouth, Va.
Selma, Rome & Dalton	H. J. Sitton		Selma, Ala.
Selma, Marion & Memphis	J. M. Levis	John Hickey	Marion, Ala.
Sheboygan & Fond du Lac	John Hickey		Sheboygan, Wis.
Shenango & Allegheny	Edw Richardson		Greenville, Pa.
Shepaug	C. M. Allen	C. H. Foster	Litchfield, Ct.
Sioux City & Pacific	C. H. Foster		Missouri Valley, Ia.
Sioux City & St. Paul	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Southern Pacific	J. T. Wilson	F. N. Bellisle	San Francisco, Ca.
Northern Division	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Los Angeles & Yuma Div	S. Johnson		Tulare, Cal.
Tulare Division	§P. J. Cochrane	Geo. H. Gramling	Charleston, S. C.
South Carolina	Chas. G. Brown	H. Mooney	Auburn, N. Y.
Southern Central	Martin Carter	Martin Carter	Newark, Cal.
South Pacific Coast			

Railroad.	Master Mechanic.	Master Car Builder.	Residence.
Southwestern of Georgia	D. M. Gügel	James A. Knight	Macon, Ga.
Spartanburg, Union & Columbia	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Spartanburg & Asheville	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Springfield, Athol & Northeastern	W. E. Granger		Springfield, Mass.
Springfield Southern	F. W. Johnstone		Springfield, O.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Stockton & Copperopol's	John M. Fulton		Stockton, Cal.
Stoningt'n & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
St. Croix & Penobscot	G. H. Corsen	H. C. Tincker	Milltown, Me.
St. Johns	Jas. M. Owens		St. Augustine, Fla.
St. Joseph & Western	E. Sleppy	E. Sleppy	So. St. Joseph, Mo
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis, Iron Mount. & So	**O. A. Haynes	Oscar Doolittle	St. Louis, Mo.
Arkansas Division	L. Finlay	L. Finlay	Little Rock, Ark.
Missouri Division	W. H. Harris		De Soto, Mo.
St. Louis, Alton & Terre Haute	**Beriah Warren		St. Louis, Mo.
St. Louis, Salem & Little Rock	Thomas Everson	A. W. Grosvernor	Steelville, Mo.
St. Louis & San Francisco	M. Kearney		N. Springfield, Mo.
St. Louis, Keokuk & Northwest'n	Wm. Foley		Keokuk, Iowa.
St. Paul & Duluth	W. McFarland	John Hill	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	J. C. Munro	J. C. Munro	St. Paul, Minn.
St. Paul & Sioux City	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Sussex	E. H. Osborn	R. L. Sutton	Newton, N. J.
Syracuse, Binghamton & N. Y.	James Buchanan	James Buchanan	Syracuse, N. Y.
Syracuse, Chenango & New York	Geo. W. West		Syracuse, N. Y.

T

Railroad.	Master Mechanic.	Master Car Builder.	Residence.
Tennessee & Pacific	William McKeand	William McKeand	Nashville Tenn.
T. H. & Indianapolis (Vandalia Line. Indianapolis Div	§§C. R. Peddle	E. D. Carter	Terre Haute, Ind.
	Clinton Adler		Indianapolis, Ind
Vandalia Div.	Chas. Butler		Effingham, Ill.
Logansport Division	A. J. Prescott	H. L. Clark	Logansport, Ind.
Texas & New Orleans	E. A. Campbell		Houston, Texas.
Texas & Pacific	H. J. Small	F. M. Alexander	Marshall, Texas.
Tioga & Elmira State Line	Pere Bonny	D. H. Stratton	Blossburg, Pa.
Toledo, Delphos & Burlington	Geo. H. Tier		Delphos, O.
Toledo, Peoria & Western	W. O. Hewitt	R. M. Hemphill	Peoria, Ill.
Toronto, Grey & Bruce	†David Preston		Toronto, Can.
Toronto & Nipissing	J. Hagarty		Toronto, Can.
Troy & Boston	Z. B. Davis	R. V. Coon	Troy, N. Y.
Ulster & Delaware	J. B. Dykeman	Jno. H. Decker	Rondout, N. Y.

Railroad.	Master Mechanic.	Master Car Builder.	Residence.
U			
Union Pacific	§J. H. Congdon	‡‡Geo. F. Stevens	Omaha, Neb.
Eastern Division		A. M. Collett	Omaha, Neb.
Eastern Division		H. P. Makely	Grand Island, Neb.
Mountain Division	T. A. Davis	John E. Davis	Cheyenne, Wy. T.
Laramie Division		Floyd Heavaner	Laramie, Wy. T.
Western Division		R. V. Brinkley	Evanston, Wy. T.
Colorado Division	James S. Scott	E. G. Thomas	Golden, Col.
Union Railway & Transit Co	H. M. Smith		St. Louis, Mo.
Utah Central	W. B. Armstrong	Sam. S. Tucker	Salt Lake City.
Utah Western	Robert Anderson		Salt Lake City, U.
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Ithaca & Elmira	Geo. W. Cleveland	F. W. Magargil	Bresesport, N. Y.
V			
Vicksburg & Meridian	Jas. B. Browne		Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	C. H. Tull		Monroe, La.
Virginia & Truckee	I. N. Fording		Carson, Nev.
Wabash, St. Louis & Pacific	Chauncy Morris		Fort Wayne, Ind.
Wabash, St. Louis & Pacific	Jacob Johann	B. B. Rose	Springfield, Ill.
Wabash, St. Louis & Pacific		U. H. Kohler	Toledo, Ohio.
Wallkill Valley	A. W. Quackenbush	Jno. H. Decker	Rondout, N. Y.
Wash. City, Va. Mid. & G. South	Jas. E. Waddey	J. T. Nalls	Alexandria, Va.
Washington & Ohio	Edward Dunn	John Harrison	Alexandria, Va.
Welland	James Taylor	Wm. H. Fay	St. Catharine, C.W.
Westchester & Philadelphia	John Moyer	Nathan Pawling	Philadelphia, Pa.
Western & Atlantic	John H. Flynn	W. G. Grambling	Atlanta, Ga.
Western Maryland	§David Holtz	J. H. Nussear	Union Bridge, Md.
Western North Carolina	Geo. W. Gates		Salisbury, N. C.
Western, of Alabama	Robert King	F. M. Wade	Montgomery, Ala.
Western R. R. N. C.	Isaac W. Clark	Isaac W. Clark	Fayetteville, N. C
Western Union	John Taylor	E. A. Eddy	Racine, Wis.
West Feliciana	J. A. Tilton	Wm. McKelvey	Laurel Hill, La.
West Jersey	W. McAllister	C. C. Williams	Camden, N. J.
White Water	§L. W. Wingert		Harrison, O.
Wilmington, Columbia & Augusta	John Bissett	W. H. Day	Florence, S. C.
Wilmington & C. Weldon	John Bissett	C. R. Clowe	Wilmington, N. C.
Wisconsin Central	G. Campbell	J. L. Adams	Stevens Pt., Wis.
Worcester & Nashua	John G. Brady	John G. Brady	Worcester, Mass.

Directory of Railway Superintendents and Purchasing Agents

THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—*General Manager. †Managing Director. ‡Assistant General Superintendent. §Assistant Superintendent. **Superintendent of Transportation. §§Assistant General Manager.

A

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Adirondack	C. E. Durkee		Saratoga, N. Y.
Alabama Central	John M. Bridges		Selma, Ala.
Alabama Great Southern	Chas. P. Ball	R. W. Healey	Chattanooga, Tenn.
Albany & Susquehanna	*C. F. Young		Honesdale, Pa.
Allegheny Valley	David McCargo	John L. Awl	Pittsburg, Pa.
Anderson, Lebanon & St. Louis	Jas. A. Larned		Anderson, Ind.
Arkansas Midland	*A. H. Johnson		Helena, Ark.
Ashtabula & Pittsburg	D. B. McCoy		Ashtabula, O.
Atchison, Topeka & Santa Fe	*W. B. Strong	F. M. Smith	Topeka, Kan.
Western Division	W. W. Borst		Nickerson, Kan.
Eastern Division	D. J. Chase		Topeka, Kan.
Atchison & Nebraska	*G. M. Chittleton	G. W. P. Atkinson	Kansas City, Mo.
Atlanta & Charlotte Air Line	*G. J. Foreacre	G. J. Foreacre	Atlanta Ga.
Atlanta & West Point	L. P. Grant		Atlanta, Ga.
Atlantic & North Carolina	Jno. Hughes, Pres.		Newbern, N. C.
Atlantic, Mississippi & Ohio		J. P. Minetree	Petersburg, Va.
Atlantic, Tennessee & Ohio	J. J. Gormley		Charlotte, N. C.

B

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Baltimore & Ohio	**W. M. Clements	N. S. Hill	Baltimore, Md.
Ohio & Chicago Division	C. H. Watson		Chicago, Ill.
Pittsburg Division	G. M. Serpell		Connellsville, Pa.
Baltimore & Potomac	Geo. C. Wilkins	A. W. Sumner	Baltimore, Md.
Bangor & Piscataquis	Arthur Brown		Bangor, Me.
Bath & Hammondsport	Geo. A. Saunders	Allen Wood	Hammondsp't, N. Y.
Bedford, Spr'gville, Owensb'g & Rd.	Jas. W. Kennedy	Jas. W. Kennedy	Bedford, Ind.
Bellefonte & Snow Shoe	Daniel Rhoads		Bellefonte, Pa.
Bell's Gap	Robert G. Ford		Bellwood, Pa.
Bennington & Rutland	F. C. White	F. C. White	Rutland, Vt.
Blairstown	J. D. Vail		Blairstown, N. J.
Boston, Revere Beach & Lynn	E. H. Worf		Boston, Mass.
Boston & Albany	*Wm. Bliss		Boston, Mass.
Boston & Albany	C. O. Russell		Springfield, Mass.
Boston & New York Air Line	Jos. H. Brooklin		New Haven, Conn.
Boston & Providence	A. A. Folsom	A. A. Folsom	Boston, Mass.
Boston, Concord & Montreal	*J. A. Dodge		Plymouth, N. H.
Boston, Concord & Montreal	W. A. Stowell	J. Thomas Vose	Boston, Mass.
Boston, Hoosac Tunnel & Western	E. B. Burnham		N. Adams, Mass.
Boston & Maine	J. T. Furber	M. E. Wood	Boston, Mass.
Boston & Lowell	A. A. Hobart	F. H. Nourse	Boston, Mass.
Boston, Barre & Gardner	H. M. Witter	H. M. Witter	Worcester, Mass.
Brooklyn, Flatbush & Coney Isl'd	W. E. Dorwin		Brooklyn, N. Y.
Brunswick & Albany	C. L. Schlotter		Brunswick, Ga.
Burlington & Mo. River (in Neb.)	*A. E. Touzalin	Geo. B. Harris	Omaha, Neb.
Burlington & Mo. River (in Neb.)	Geo. W. Holdrege		Lincoln, Neb.
Burlington, Cedar Rapids & Nor'n	C. J. Ives	Rob't Williams	Cedar Rapids, Ia.
Burlington & Northwestern	John F. Gerry	John F. Gerry	Burlington, Ia.
Burlington & Southwestern	J. W. Smith	J. W. Smith	Burlington, Ia.
Buffalo & Southwestern	*John F. Moulton		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Geo. S. Gatchell	J. H. Pool	Buffalo, N. Y.

C

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Cairo & St. Louis	*L. M. Johnson	L. M. Johnson	St. Louis, Mo.
Cairo & Vincennes	Roswell Miller	T. W. Fitch	Cairo, Ill.
California Pacific & Northern	§J. A. Fillmore		Sacramento, Cal.
Camden & Atlantic	J. Ashbridge		Camden, N. J.
Canada Central	T. A. McKinnon	F. A. Lister	Brockville, Can.
Canada Southern	*Wm. P. Taylor	A. F. Howland	St. Thomas, Ont.
U. S. Division	E. F. Murray		Toledo, O.
Canada Division	W. E. Carroll		St. Thomas, Ont.
Canadian Pacific	J. F. Lynskey		Winnepeg, Man.
Carbondale & Shawnestown	R. J. Cavet		Carbondale, Ill.
Carolina Central	V. Q. Johnson	C. H. Roberts	Wilmington, N. C.
Catasauqua & Fogelsville	C. W. Chapman	C. W. Chapman	Catasauqua, Pa.
Cayuga Southern	W. Stevenson		Sayre, Pa.
Cayuga & Susquehanna	W. R. Humphreys		Ithaca, N. Y.
Cazenovia, Canastota & De Ruyter	John Stebbins		Cazenovia, N. Y.
Central Pacific	*A. N. Towne		San Francisco, Cal.
Central Pacific	‡E. C. Fellows		San Francisco, Cal.
Central Pacific		J. R. Watson	Sacramento, Cal.
Western & Visalia Divisions	A. D. Wilder		Oakland, Cal.
Truckee Division	Frank Free		Wadsworth, Nev.
Humboldt Division	G. W. Coddington		Carlin, Nev.
Salt Lake Division	A. G. Fell		Ogden, Utah
Sacramento & Oregon Div	R. H. Pratt		Sacramento, Cal.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Central Vermont	J. W. Hobart		St. Albans, Vt.
Central Vermont	‡J. M. Fo-s		St. Albans, Vt.
Western Division	John S. brier		Ogdensburg, N. Y.
Central & Southern Division			St. Albans, Vt.
Rutland Division	J. Burdett		Rutland, Vt.
New London Northern	G. W. Bentley	G. W. Bentley	New London, Conn.
Central of Georgia	Wm. Rogers	Henry Yonge	Savannah, Ga.
Atlanta Division	W. G. Raoul		Macon, Ga.
Central of Iowa	D. N. Pickering	D. N. Pickering	Marshalltown, Ia.
Central of New Jersey	James Moore	B. W. Burnet	Elizabeth, N. J.
Central Division	W. W. Stearns		Elizabeth, N. J.
Lehigh & Susq. Division	W. S. Polhemus		Mauch Chunk, Pa.
Champaign, Havana & Western	A. H. Wood		Urbana, Ill.
Charlotte, Columbia & Augusta	Jno. G. Clarke		Columbia, S. C.
Chepaug	C. H. Platt	C. H. Platt	Litchfield, Conn.
Chesapeake & Ohio	W. M. S. Dunn	J. A. Netherland	Richmond, Va.
Cherraw & Darlington	R. D. Townsend		Society Hill, S. C.
Cherokee	John Postell		Atlanta, Ga.
Cheshire	R. Stewart	H. H. Stone	Keene, N. H.
Chester & Lenoir	James Mason		Chester, S. C.
Chicago & Northwestern	*Marvin Hughitt	R. W. Hamer	Chicago, Ill.
Chicago & Northwestern	§Chas. C. Wheeler		Chicago, Ill.
Wisconsin & Mill. Division	E. J. Cuyler		Chicago, Ill.
Peninsula Division	W. B. Lindsay		Escanaba, Mich.
Madison Division	C. A. Swineford		Baraboo, Wis.
Galena Division	Chas. Murray		Chicago, Ill.
Des Moines & Iowa Division	J. S. Oliver		Clinton, Iowa.
Winona & St. Peter Division	S. Sanborn		Winona, Minn.
Galena & Wisconsin Br	J. B. Trull		Galena, Ill.
Chicago & Alton	J. C. McMullen	A. V. Hartwell	Chicago, Ill.
Chicago & Alton	‡C. H. Chappell		Bloomington, Ill.
Chicago Division	A. M. Richards		Chicago, Ill.
St. Louis Division	T. M. Bates		Hoodhouse, Ill.
Kansas City Division	J. H. Wood		Kansas City, Mo.
Chicago & Block Coal	*A. F. Beach		Veedersburg, Ind.
Chicago, Burlington & Quincy	Thos. J. Potter	Wm. Irving	Chicago, Ill.
Chicago, Burlington & Quincy	§John D. Besler		Galesburg, Ill.
Chicago, Burlington & Quincy	§E. Ryder		Chicago, Ill.
Chicago Division	George Alexander		Chicago, Ill.
Middle. Galesb'g & Q'y Div	H. Hitchcock		Galesburg, Ill.
St. Louis & R. Isl'd Division	W. R. Crumpton		St. Louis Mo.
Iowa Division	C. Perkins		Burlington, Iowa
Chi., Clinton, Dubuque & Minn	*F. O. Wyatt	F. O. Wyatt	Dubuque, Iowa.
Chicago & Eastern Illinois	O. S. Lyford	O. S. Lyford	Chicago, Ill.
Chicago & Iowa	W. H. Holcomb		Rochelle, Ill.
Chicago & Northeastern	J. M. Turner		Lansing, Mich.
Chicago & Pacific	*J. M. Whitman	James Penny	Chicago, Ill.
Chicago & Paducah	D. H. Cocklin		Streator, Ill.*
Chicago & Paducah		C. L. Rising	Chicago, Ill.
Chicago, St. Louis & New Orleans	*J. C. Clarke	J. C. Febiger, Jr	New Orleans, La.
South Division	W. P. McKinley		McComb City, Miss.
North Division	J. G. Mann		Jackson, Tenn.
Chicago, Rock Island & Pacific	A. Kimball		Davenport, Iowa.
Chicago, Rock Island & Pacific	‡A. Manvel	A. Manvel	Chicago, Ill.
Southwestern Division	G. F. Walker		Trenton, Mo.
Iowa Division	H. F. Royce		Des Moines, Iowa
Keokuk & Des Moines Div	John Givin		Keokuk, Ia.
Chicago & West Michigan	Geo. C. Kimball	H. Park	Muskegon, Mich.
Chicago & West Michigan	§C. M. Lawler		St. Joseph, Mich.
Chicago, Milwaukee & St. Paul	W. C. Van Horne	J. T. Crocker	Milwaukee, Wis.
Ch. Lac Crosse & P. du C. Div	H. C. Atkins		Milwaukee, Wis.
Northern Division	L. B. Rock		Milwaukee, Wis.
I. & M., & I. D. Division	C. H. Prior		Minneapolis, Minn.
Wabasha Division	J. H. Lakey		Wabasha, Minn.
Western Union Division	D. A. Olin		Racine, Wis.
Sioux City & Dak. Div	G. E. Merchant		Sioux City, Ia.
Southern Minnesota Div	J. M. Egan	J. M. Egan	La Crosse, Wis.
Chicago, Pekin & Southwestern	J. Murray	C. L. Rising	Chicago, Ill.
Chicago, Pekin & Southwestern			Streator, Ill.
Chicago, St. Paul & Minneapolis	E. W. Winter		St. Paul, Minn.
Chicago & West Michigan	*Geo. C. Kimball	H. Park	Muskegon, Mich.
Chicago & Grand Trunk	Henry Funnell		Battle Creek, Mich.
Chicago & Grand Trunk		N. Wall	Port Huron, Mich.
Chippewa Falls & Western	L. C. Stanley		Chippewa Falls, Wis.
Cincinnati & Eastern	George H. Wilber		Batavia, O.
Cincinnati, Wabash & Michigan	*Norman Beckley	Norman Beckley	Elkhart, Ind.
Cincinnati, Richmond & Chicago	Lewis Williams		Cincinnati, O.
Cincinnati, Rockp't & Southwest'n	H. C. Branham	H. C. Branham	Rockport, Ind.
Cincinnati & Terre Haute	John Holland		Terre Haute, Ind.
Cin., Newport & Cov. & Charleston	W. J. Taylor		Knoxville, Tenn.
Cincinnati, Hamilton & Dayton	Lewis Williams	Lewis Williams	Cincinnati, O.
Cin., Hamilton & Indianapolis	Lewis Williams		Cincinnati, O.
Cincinnati, Lafayette & Chicago	J. W. Sherwood		Cincinnati, Ohio.
Cin., Sandusky & Cleveland	*D. W. C. Brown	Frank Herriman	Sandusky, O.
Cin., Sandusky & Cleveland	Chas. Howard		Sandusky, O.
Cincinnati Southern	Sam'l Woodward	C. M. Woodward	Cincinnati, O.
Cin., Indianapolis, St. Louis & Chi	J. W. Sherwood		Indianapolis, Ind.
Cin., Indianapolis, St. Louis & Chi		George Tozzer	Cincinnati, O.
Cleve., Col., Cin. & Indianapolis	**E. B. Thomas	J. L. Yale	Cleveland, O.

Railroad	*Superintendent. Purchasing Agent.*	*Residence.*
Indianapolis Division	C. C. Gale	Indianapolis, Ind
Col. and Cincinnati Divs	Robert Blee	Cleveland, O.
Cleveland & Pittsburg	John Thomas	Cleveland, O.
Cleveland & Pittsburg	*J. D. Layng ..... Wm. Mullins	Pittsburg, Pa.
Cleveland, Mt. Vernon & Columb's	G. A. Jones	Mt. Vernon, O.
Cleve., Tuscarawas Val. & Wheel.	*Oscar Townsend	Cleveland, O.
Cobourg, Petersboro & Marmora	James R. Barber ..... J. R. Barber	Cobourg, Ont.
Columbus & Hocking Valley	Orland Smith	Columbus, O.
Columbus & Toledo	Orland Smith ..... Geo. R. Carr	Columbus, O.
Columbus & Rome	T. J. Nuckolls	Columbus, Ga.
Concord & Claremont	George E. Todd	Concord, N. H.
Concord	H. E. Chamberlin ..... H. E. Chamberlin	Concord, N. H.
Concord & Portsmouth	H. E. Chamberlin	Concord, N. H.
Connecticut Central	D. D. Warren, Pres	Springfield, Mass.
Connecticut Riv r	John Mulligan ..... John Mulligan	Springfield, Mass.
Connecticut Valley	Samuel Babcock	Hartford, Conn.
Connecticut Western	J. F. Jones	Hartford, Conn.
Connecticut & Passumpsic Rivers	H. E. Folsom	Lyn o ville, Vt.
Corning, Cowanesque & Antrim	A. H. Gorton	Corning, N. Y.
Covington, Col. & Black Hills	J. I. Booge	Sioux City, Iowa.
Cumberland Valley	J. F. Boyd ..... O. N. Lull	Chambersburg, Pa.
Cumberland & Pennsylvania	*I. L. Burwell ..... P. L. Burwell	Cumberland, Md.
Cumberland & Maurice River	L. H. Dowdney	Port Norris, N. J.

D

Danbury & Norwalk	L. W. Sandiforth	South Norwalk, Ct.
Danville & Southwestern	James A. Eads	Paris, Ill.
Davenport & Northwestern	D. Flaugzan	Davenport, Ill.
Dayton, Covington & Toledo	*J. O. Arnold ..... C. C. Lneisly	Dayton, O.
Dayton & Michigan	J. H. Weller	Dayton, O.
Dayton & Union	C. C. Gale	Indianapolis, Ind.
Dayton & Southeastern	J. E. Gimperling, *Rec* .. E. F. Pryor	Dayton, O.
Delaware & Chesapeake	O. S. Sanford	Easton, Md.
Delaware & Hudson Canal Co	R. Manville ..... J. White Sprong	Albany, N. Y.
Delaware & Hudson Canal Co	*C. F. Young	Honesdale, Pa.
Albany & Susq. Division	C. D. Hammond	Albany, N. Y.
Rensselaer & Saratoga Div	Theo. Voorhees	Troy, N. Y.
Delaware, Lackawanna & Western	..... G. W. B. Cushing	New York City.
Delaware, Lackawanna & Western	W. F. Hallstead	Scranton, Pa.
Bloomsburg Division	G. Bogart	Scranton, Pa.
Morris & Essex Division	And New Reasoner	Hoboken, N. J.
Oswego & Syracuse Division	W. B. Phelps	Oswego, N. Y.
Utica, Chenango & Sus. Div	W. G. Oakman	Scranton, Pa.
Delaware Western	David Connell	Wilmington, Del.
Denver & Rio Grande	S. R. Ainslie ..... S. R. Ainslie	Denver, Col.
Denver, South Park & Pacific	C. W. Fisher ..... Charles Wheeler	Denver, Col.
Des Moines, Adel & Western	C. N. Gilmore	Adel, Iowa.
Des Moines & Ft. Dodge	C. N. Gilmore ..... C. N. Gilmore	Des Moines, Ill.
Detroit & Bay City	S. R. Callaway ..... Allan Bourn	Detroit, Mich.
Detroit, Gr. Haven & Milwaukee	W. J. Morgan ..... John S. Lorimer	Ypsilanti, Mich.
Detroit, Hillsdale & Southwestern	W. F. Parker	Detroit, Mich.
Detroit, Lansing & Northern	J. B. Mulliken ..... Allan Bourn	Cambridge, Md.
Dorchester & Delaware	J. Murphy	Dunkirk, N. Y.
Dunkirk, Allegheny Val. & Pitts	D. Thayer	
Dunkirk, Allegheny Val. & Pitts		C. V. Deforest ..... New York City.

E

East Broad Top	A. W. Sims	Orbisonia, Pa.
East Alabama & Cincinnati	W. W. Barnes	Opelika, Ala.
East Line & Red River	W. B. Ward	Jefferson, Tex.
East Tenn., Virginia & Georgia	*I. P. O'Brien ..... J. F. O'Brien	Knoxville, Tenn.
Eastern	**D. W. Sanborn ..... Geo. J. Fisher	Boston, Mass.
Eastern Kentucky	H. W. Bates ..... H. W. Bates	Riverton, Ky.
Eastern Kentucky	Geo. Noble	Riverton, Ky.
Eastern Shore	W. Thompson	Prince Anne, Md.
Erie & Pittsburg	J. M. Kimball	Erie, Pa.
Erie & Pittsburg	*J. D. Layng ..... Wm. Mullins	Pittsburg, Pa.
Eureka & Palisade	P. Evans	Palisade, Nev.
European & North American	F. W. Cram	Bangor, Maine.
Evansville & Terra Haute	J. E. Martin ..... Jno. L. White	Evansville, Ind.
Evansville, Terra Haute & Chi	Jos. Collett ..... W. D. Macfarland	Terra Haute, Ind.

F

Fitchburg	John Adams ..... F. S. Pratt	Boston, Mass.
Vermont & Mass. Div	‡E. K. Turner	Fitchburg, Mass.
Flint & Pere Marquette	Sanford Keeler ..... G. G. Cook	E Saginaw, Mich.
Florida Central	W. M. Davidson ..... W. M. Davidson	Jacksonville, Fla.
Flushing, North Shore & Central	Samuel Spencer ..... Samuel Spencer	L'g Isl'd C'y, N. Y.
Fonda, Johnstown & Gloversville	L. Caten	Gloversville, N. Y.
Fon du Lac, Amboy & Peoria	A. Kingon	Fond du Lac, Wis.
Fort Madison & Northwestern	S. B. Kenrick ..... S. B. Kenrick	Fort Madison, Ia.
Fort Wayne & Jackson	M. D. Woodford ..... H. A. Raymond	Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	W. W. Worthington & P. Ag't	Fort Wayne, Ind.
Foxburg, St. Petersburg & Clarion	Benj. B. Newton	Foxburg, Pa.
Frankfort & Kokomo	E. Y. Comstock	Frankfort, Ind.
Fredericton	F. B. Edgecombe	Fredericton, N. B.
Freehold & New York	J. E. Ralph	Freehold, N. J.

G

Gal., Harrisburg & San Antonio	James Converse	Houston, Texas.
Gal., Houston & Henderson	*H. M. Hoxie ..... H. M. Hoxie	Palestine, Texas.
Geneva, Ithaca & Sayre	Wm. Stevenson	Sayre, Pa.
Georgia	S. K. Johnson ..... S. K. Johnson	Augusta, Ga.
Grand Haven	*F. H. May ..... F. H. May	Allegan, Mich.
G. Rapids, Newaygo & L. Shore	C. Warner	G. Rapids, Mich.
Grand Rapids & Indiana	W. O. Hughart, Pres't .. W. R. Shelby	G. Rapids, Mich.
Northern Division	J. M. Matheany	G. Rapids, Mich.
Southern Division	P. S. O'Rourke	Fort Wayne, Ind.
Grand Trunk	*J. Hickson ..... John Taylor	Montreal, Canada.
Grand Trunk	W. J. Spicer	Montreal, Canada.
Grand Tower & Carbondale	T. M. Williamson ..... Wm. W. Harris	Grand Tower, Ill.
Grayville & Mattoon	*G. L. Bradbury	Mattoon, Ill.
Grayville & Mattoon	G. R. Cobleigh	Mattoon, Ill.
Great Western (Canada)	Charles Stiff	Hamilton, Ont.
Great Western (Canada)		G. R. Nash ..... London, Ont.
Green Bay & Minnesota	*Timothy Case	Green Bay, Wis.
Greenville & Columbia	J. W. Fry	Columbia, S. C.
Greenville, Col. & Birmingham	S. P. Bush	Greenville, Miss.
Greenwich & Johnsonville	H. H. Warner	Greenwich, N. Y.
Gulf, Colorado & Santa Fé	O. H. Dorrance	Galveston, Texas.
Gulf, Western Texas & Pacific	M. D. Monserrate	Cuero, Texas.

H

Hamilton & Northwestern	*F. W. Cumberland	Hamilton, Ont.
Hannibal & St. Joseph	W. R. Woodward ..... T. L. Dunn	Hannibal, Mo.
Hannibal & St. Joseph	W. R. Woodward	Hannibal, Mo.
Eastern Division		Hannibal, Mo.
Western Division	W. C. Alberger	Kansas City, Mo.
Hanover Junction & Gettysburg	Henry A. Young	Hanover, Pa.
Harlem Extension South	*R. C. Root	Bennington, Vt.
Havana, Rantoul & Eastern	H. E. Bullock ..... H. E. Bullock	Rantoul, Ill.
Housatonic	L. B. Stillson ..... D. L. Draper	Bridgeport, Conn.
Houston, East & West Texas		Houston, Texas.
Houston & Texas Central	A. H. Swanson ..... A. H. Swanson	Houston, Texas.
Southern Division	M. G. Howe	Houston, Texas.
Northern Division	G. A. Quinlan	Corsicana, Texas.
Huntingdon & Broad Top	Geo. F. Gage ..... S. B. Knight	Huntingdon, Pa.

I

Illinois Central	E. T. Jeffrey ..... O. Ott	Chicago, Ill.
Chicago Division	C. A. Beck	Centralia, Ill.
Northern Division	J. C. Jacobs	Amboy, Ill.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Iowa Division	D. W. Parker		Dubuque, Ia.
Springfield Division	T. J. Hudson		Springfield, Ill.
Illinois Midland	D. K. Smith	J. G. Clifford	Paris, Ill.
Illinois & St. Louis	C. H. Sharman		St. Louis, Mo.
Indiana, Bloomington & Western	I. D. Barton	H. C. Norton	Indianatolis, Ind.
Indianapolis, Decatur & Spring.	H. S. Morse		Indianap lis, Ind.
Indianapol's & St. Louis	E. B. McClure	H. W Comstock	Indianapolis, Ind.
Indianapolis, Peru & Chicago	§§E. C. Murphy		Indianapolis, Ind.
Indianapolis, Peru & Chicago		John Mc Kenna	Peru, Ind.
Indianapolis & Vincennes	J. J. Turner		Indianapolis, Ind
Intercolonial	D. Pottinger	L. B. Archibald	Moncton, N. B.
Halifax & St. John Division	Jas. Coleman		Truro, N. S.
Northern Division	M. Busby		Campbellt'n, N. B.
International & Great Northern	*H. M. Hoxie	H. M. Hoxie	Galveston, Texas.
Iowa Eastern	H. H. Kerr		Beulah, Iowa.

J

Jacksonville, N. Western & S. E.	E. S. Greenleaf	Jacksonville, Ill.
Jacksonville, Pen. & Mobile		J. D. Hollister ..... Tallahassee, Fla.
Jeff., Madison & Indianapolis	E. W. McKenna	Louisville, Ky.
Jeff., Madison & Indianapolis		Wm. Mullins ..... Pittsburg, Pa.
Junction & Breakwater	Tho. Grcome	Lewes, Del.

K

Kansas Central	W. A. Martin ..... W. A. Martin	Leavenworth, Kan.
Kan. City, Burlington & Santa Fe	James Houston	Burlington, Kan.
Kansas City, Fort Scott & Gulf	L. W. Towne ..... G. W. P. Atkinson	Kansas City, Mo.
Kansas City, Lawrence & South.	L. W. Towne ..... G. W. P. Atkinson	Kansas City, Mo.
Kan. City, St. Joseph & C. Bluffs	J. F. Barnard	St. Joseph, Mo.
Kan. City, St. Joseph & C. Bluffs	*G. H. Nettleton ..... G. W. P. Atkinson	Kansas City, Mo.
Kansas City & Eastern	H. Hale	Independence, Mo.
Kansas Pacific	*S. H. H. Clark ..... A. D. Clark	Omaha, Neb.
Kansas Pacific	S. T. Smith	Kansas City, Mo.
Kaw Valley Division	J. O. Brinkerhoff	Kansas City, Mo.
Smoky Hill Division	J. T. Odell	Ellis, Kansas.
Denver Division	J. T. Odell	Denver, Col.
Cheyenne Division	A. A. Egbert	Denver, Col.
Kent Co. & Smyrna & Del. Bay	J. F. Bingham	Chestertown, Md.
Kentucky Central	J. R. Ledyard	Covington, Ky.
Kingston & Pembroke	B. W. Folger ..... Wm. Harty	Kingston, Can.
Knox & Lincoln	C. A. Coombs ..... C. A. Coombs	Bath, Maine.
Knoxville & Ohio	G. J. Kinzel	Knoxville, Tenn.

L

Lake Erie & Western	*E. H. Waldron ..... E. H. Andress	Lafayette, Ind.
Eastern Division	Geo. G. Hadley	Fremont, Ohio.
Western Diuision	D. S. Hill	Lafayette, Ind.
Lake Ontario Southern	*Jas. E. Briggs	Newark, N. Y.
Lake Shore & Mich. Southern	*John Newell	Cleveland, Ohio.
Lake Shore & Mich. Southern	Charles Paine ..... A. C. Armstrong	Cleveland, Ohio.
Buffalo & Erie Division	C. B. Couch	Cleveland, Ohio.
Toledo Division	Thos. Flesher, Jr	Toledo, Ohio.
Michigan Division	J. E. Curtis	Detroit, Mich.
Detroit Division	P. S. Bodgett	Detroit, Mich.
Western Division	J. H. Parsons	Chicago, Ill.
Lansing Division	T. J. Charlesworth	Lansing, Mich.
Franklin Division	Geo. H. McIlvaine	Stoneboro, Pa.
Lehigh Valley	Robert H. Sayre	Bethlehem, Pa.
Lehigh Valley	..... L. Chamberlin	Philadelphia, Pa.
Beaver Meadow Division	A. G. Brodhead, Jr	Mauch Chunk, Pa
Mahanoy Division	James I. Blakslee	Mauch Chunk, Pa.
New Jersey Division	H. E. Packer	Metuchen, N. J.
Wyoming Division	A. Mitchell	Wilkesbarre, Pa.
Lewis & Kennebec	W. C. Hall	Quebec, Can.
Ligonier Valley	Thos. A. Mellon	East Liberty, Pa.
Little Rock & Fort Smith	T. Hartman	Little Rock, Ark.
Little Rock, Miss. River & Texas	J. A. Woodson ..... J. A. Woodson	Pine Bluff, Ark.
Los Angeles & Independence	§W. J. L. Moulton	Los Angeles, Cal.
Long Island	T. R. Sharp, Rec .. R. M. Galloway	L'g Isla'd C'y, N.Y
Louisville & Nashville	*F. de Funiak	Louisville, Ky.
Louisville & Nashville	D. W. C. Rowland ..... G. C. Breed	Louisville, Ky.
St. L. & S. F. & N. & D. Div	James Montgomery	St. Louis, Mo.
Memphis Line	J. T. Harrahon	Memphis, Tenn.
Nashville & Decatur Div	James Geddes	Nashville, Tenn.
So. & North Ala. Division	R. Dunham	Birmingham, Ala.
Louisville, Cincinnati & Lexington	Wm. Mahl ..... Wm. Mahl	Louisville, Ky.
Louisville, New Albany & Chicago	J. MacLeod ..... Wm. M. Lewis	New Albany, Ind.
Louisville, N. Albany & St. Louis	E. Newland, Pres	New Albany, Ind.

M

Macon & Brunswick	Jas. M. Edwards ..... W. C. Jones	Macon, Ga.
Maine Central	Payson Tucker	Portland, Me.
Manchester & Keene	Charles E. Paige	Nashua, N. H.
Manchester & Lawrence	H. E. Chamber'n	Concord, N. H.
Manchester & North Weare	H. E. Chamberlin	Concord, N. H.
Manhattan Beach	A Corbin, *Pres't*	New York, N. Y.
Manhattan Elevated		M. K. King ..... New York, N. Y.
Manhattan Elevated	§§Frank K. Hain	New York, N. Y.
Manhattan Elevated	Robert Stewart	New York, N Y.
Eastern Division		New York, N Y.
Western Division	Jas. H. Stewart. J. H. Stewart	Cincinnati, O.
Marietta & Cincinnati	S. C. Baldwin ..... R. B. Hoover	Marietta, O.
Marietta, Pittsburg & Cleveland	*Samuel Schoch	Marquette, Mich.
Marquette, Houghton & Ontonag'n	S. Whidden	Smethport, Pa.
McKean & Buffalo	*Rudolph Fink	Memphis, Tenn.
Memphis & Little Rock	W. E. Smith	Memphis, Tenn.
Memphis & Little Rock	John A. Grant ..... John A. Grant	Huntsville, Ala.
Memphis & Charleston	*N. Monsarrat ..... N. Monserrat	Paducah, Ky.
Memphis, Paducah & Northern	*M. S. Hadley	Romeo, Mich.
Michigan Air Line	*H. B. Ledyard ..... Allan Bourn	Detroit, Mich.
Michigan Central	*E. C. Brown	Jackson, Mich.
Michigan Central	Mackinaw & Saginaw Div ... W. A. Vaughan	Bay City, Mich.
Main Ln & G. R. & Kal. Div's	C. B. Bush	Jackson, Mich.
Middleburg & Schoharie	P. S. Demforth	Middleburg, N.Y.
Middletown & Crawford	D. Thompson	Thompson, Ridge, N.Y
Midland Railway of Canada	H. G Taylor	Port Hope, Ont.
Milwaukee, Lake Shore & West'n	H. G. H. Reed	Milwaukee, Wis.
Mineral Point	G. W. Cobb ..... G. W. Cobb	Mineral Point, Wis.
Mineral Range	*C. E. Holland	Hancock, Mich.
Minneapolis & St. Louis	*Chas. F. Hatch ..... Chas. F. Hatch	Minneapolis, Minn.
Minneapolis & St. Louis	E. W. Gaylord ..... E. W. Gaylord	Minneapolis, Minn.
Minnesota Midland	J. H. Lakey	Wahasha, Minn.
Mississippi & Tennessee	M. Burke ..... M. Burke	Memphis, Tenn.
Missouri, Iowa & Nebraska	Col. Henry Hill ..... J. FitzHenry	Alexandria, Mo.
Missouri, Kansas & Texas	*Abram Mitchell ..... G. M. Babcock	Sedalia, Mo.
Sedalia Ft. S. & Neosho Div	L. Pearson	Sedalia, Mo.
Cherokee & Choctaw Div	E. Harding	Denison, Tex.
Missouri Division	Geo. H. Huntington	Hannibal, Mo.
Fort Scott Division	L. Pearson	Sedalia, Mo.
Missouri Pacific	A. A. Talmage ..... R. B. Lyle	St. Louis, Mo.
Missouri Pacific	†A. W. Dickinson	St. Louis, Mo.
Eastern Division	Miller Bullard	St. Louis, Mo.
Central Branch Division	W. S. Fagan	Kansas City, Mo.
Western Division	Warder Cumming	Mobile, Ala.
Mobile & Alabama Grand Trunk	F. B. Clark, Prest	Mobil., Ala.
Mobile & Ohio	*A. L. Rives ..... A. L. Rives	Jackson, Tenn.
Northern Division	E. S. Hosford	Mobile, Ala.
Southern division	C. Fleming	Columbus, Ga.
	W. L. Clark	Montgomery, Ala.
Mobile & Girard	B. Dunha'n	Mont Alto, Pa.
Mobile & Montgomery	G. B. Weistling	Macon, Ga.
Mont Alto	W. G. Raoul	
Montgomery & Eufaula		

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Montpelier & Wells River	W. A. Stowell		Montpelier, Vt.
Montrose	J. I. Blakeslee	J. I. Blakeslee	Mauch Chunk, Pa.
Morgan's Louisiana & Texas	Geo. Pandeley	C. A. Whitney & Co.	New Orleans, La.
Muncy Creek	H. R. Mehrling		Hughesville, Pa.

N

Nashua, Acton & Boston	H. E. Chamberlin		Concord, N. H
Nashua & Lowell	Chas. E. Paige	Chas. E. Paige	Nashua, N. H.
Nashville, Chattanooga & St. Louis	J. C. Wrenne		Nashville, Tenn.
Natchez, Jackson & Columbus	J. H. Fitzpatrick		Natchez, Miss.
Naugatuck	Geo. W. Beach	Geo. W. Beach	Waterbury, Conn.
Nebraska	Wm. Irving		Omaha, Neb.
Newburg, Dutchess & Connecticut	C. L. Kimball	C. L. Kimball	Dutchess J'n, N.Y.
New Brunswick & Canada	John Stewart		St. Stephen, N. B.
New Brunswick	Thos. Hoben	T. Burpee	Gibson, N. B.
New Canaan	Wm. St. John		New Canaan, Conn.
New Castle & Franklin	A. Vandivort		New Castle, Pa.
New Haven & Derby	R. S. Quintard		Nashville, Tenn.
New Haven & Northampton	C. N. Yeamans	C. N. Yeamans	New Haven, Conn.
New Jersey & New York	J. D. Hasbrouck		Jersey City, N. J.
New Jersey Midland	W. E. Lewis		Jersey City, N. J.
New Jersey Southern	W. S. Sneden		110 Lib. st., N. Y.
New Orleans & Selma	T. H. Du Puy		Selma, Ala.
New Orleans & Mobile	D. R. Robinson	John J. Howell	New Orleans, La.
New York, Lake Erie & Western	*Robert Harris		New York, N. Y.
New York, Lake Erie & Western	E. S. Bowen	J. A. Hardenbergh	New York, N. Y.
New York, Lake Erie & Western	†O. Charnute		New York, N. Y.
New York, Lake Erie & Western	*†P. P. Wright		Jersey City, N. J.
Eastern Division	E. O. Hill		Port Jervis, N. Y.
Delaware Division	Benj. Thomas		Port Jervis, N. Y.
Susquehanna Division	R. R. Cable		Elmira, N. Y.
Buffalo & Rochester Div	R. G. Taylor		Buffalo, N. Y.
Western Division	J. S. Beggs		Dunkirk, N. Y.
New York & Greenwood Lake	C. W. Douglas	C. W. Douglas	Jersey City, N. J.
New York, New Haven & Hartford	E. M. Reed	R. N. Dowd	New Haven, Conn.
N. Y. & N. H. Division	John T. Moody		New York, N. Y.
Hartford Division	C. S. Davidson		Hartford, Conn.
Shore Line Division	W. H. Stevenson		New Haven, Conn.
New York Central & Hudson Riv			
Hudson River & Harlem Div	J. M. Toucey	C. V. DeForest	New York, N. Y.
East'n Division	Zenas C. Priest		Utica, N. Y.
Western Division	Geo. H. Burrows		Rochester, N. Y.
New York Central Division	Jas. Tillinghast		Albany, N. Y.
New York & Harlem	Chas. M. Bissell	R. C. Moore	New York, N. Y.
New York & New England	*Jas. H. Wilson	W. W. McKim	Boston, Mass.
Eastern Division	H. M. Britton		Boston, Mass.
Norwich Division	F. St. M. Andrews		Norwich, Conn.
Western Division	J. T. McManus		Hartford, Conn.
New York, Ontario & Western	*Theo. Houston		New York, N. Y.
Northern Division	C. W. Langhor		Norwich, N. Y.
Southern Division	A. H. Danforth		Middletown, N. Y.
New York, Penn. & Ohio	P. D. Cooper	J. H. Holway	Cleveland, O.
First & Second Divisions	A. L. Dunbar		Meadville, Pa.
Third and Fourth Divisions	T. A. Phillips		Galion, O.
Mahoning Division	J. M. Ferris		Cleveland, O.
Northern Pacific	*H. E. Sargent	E. T. Williams	St. Paul, Minn.
Northern Pacific	H. A. Towne		Brainerd, Minn.
Pacific & P. Oreille Div	J. W. Sprague	J. W. Sprague	New Tacoma, W. T.
Northern of Canada	*F. W. Cumberland		Toronto, Can.
North Carolina	See Piedmont Air-Line.		
Northern Central	*Frank Thomson		Philadelphia, Pa.
Northern Central		A. W. Sumner	Baltimore, Md.
Baltimore Division	G. C. Wilkins		Baltimore, Md.
Elmira & Canandaigua Div	R. Neilson		Elmira, N. Y.
Susquehanna Division	W. A. Baldwin		Williamsport, Pa.
Northern (New Hampshire)	George E. Todd		Concord, N. H.
Northeastern (Georgia)			Athens, Ga.
Northeastern (South Carolina)	A. F. Ravenel		Charleston, S. C.
North Pacific Coast	*John W. Doherty	W. F. Russell	San Francisco, Cal.
Northwestern Ohio	J. S. Morris		Toledo, O.

O

Ogdensburg & Lake Champlain	W. W. Hungerford		Ogdensburg, N. Y.
Ohio Central	P. Pease		Columbus, O.
Ohio & Mississippi	W. W. Peabody		Cincinnati, O.
Ohio & Mississippi		G. E. Atwood	St. Louis, Mo.
Eastern Division	C. B. Cole		Seymour, Ind.
Western Division	C. M. Stanton		St. Louis, Mo.
Louisville Division	C. Cole		Louisville, Ky.
Ohio & Toledo	N. A. Smith		Carrollton, O.
Old Colony	J. R. Kendrick	F. P. Moseley	Boston, Mass.
Northern Division	§S. A. Webber		Fitchburg, Mass.
Cape Cod Division	§C. H. Nye		Hyannis Mass.
Main Line Division	§J. H. French		Boston, Mass.
Olean, Bradford & Warren	J. W. Watson		Oleon, N. Y.
Omaha & Republican Valley	P. J. Nichols		Omaha, Neb.
Omaha & Northern Nebraska	J. E. House		Omaha, Neb.
Oregon & California	Ben. Jno. Jr	J. Brandt, Jr	Portland, Oregon.
Oregon Railway & Navigation Co.	G. J. Ainsworth		Portland, Oregon.
Owensboro & Nasoville	L. Culverhouse		Owensboro, Ky.

P

Paducah & Elizabethtown	Robert Meek		Elizabethtown, Ky.
Painesville & Youngstown	**J. A. Newcome		Youngstown, O.
Panama			Aspinwall, U. S. C.
Parker & Karns City	W. C. Moberly		Parker City, Pa.
Peach Bottom	S. M. Manifold		York, Pa.
Paw Paw & Toledo & South Haven	John Ring		Lawton, Mich.
Pennsylvania	*Frank Thomson	Enoch Lewis	Philadelphia, Pa.
Pennsylvania	Charles E. Pugh		Altoona, Pa.
Pennsylvania	**John Reilly		Altoona, Pa.
New York Division	James McCrea		Jersey City, N. J.
Amboy Division	I. S. Buckelew		Camden, N. J.
Belvidere Division	J. A. Anderson		Lambertville, N. J.
New Jersey Division	F. Wolcott Jackson		Jersey City, N. J.
Philadelphia Division	W. F. Lockard		Philadelphia, Pa.
Middle Division	S. M. Prevost		Harrisburg, Pa.
Pittsburg Division	Robert Pitcairn		Pittsburg, Pa.
Tyrone Division	S. S. Blair		Tyrone, Pa.
Bedford Division	A. Roberts		Harrisburg, Pa.
West Pennsylvania Division	E. B. Taylor		Allegheny City, Pa.
Lewistown Division	J. B. Hutchinson		Lewistown, Pa.
Pensacola	W. D. Chipley		Pensacola Fla.
Pensacola & Selma	W. D. Chipley		Pensacola, Fla.
Peoria, Decatur & Evansville	G. R. Cobleigh	G. R. Cobleigh	Pekin, Ill.
Peoria, Pekin & Jacksonville	*Geo. Skinner	Geo. Skinner	Peoria, Ill.
Peoria & Springfield	J. R. Hillard		Peoria, Ill.
Petersburg	R. Sully	L. E. Clark	Petersburg, Va.
Philadelphia & Atlantic City	Ellis Clark	Ellis Clark	Philadelphia, Pa.
Philadelphia & Reading	†E. P. Wolcten	W. S. Wilson	Philadelphia, Pa.
Catawissa & Williamsport Br.	D. C. Reinhart		Williamsport, Pa.
Reading & Columbia	Alex. M. Wilson		Columbia, Pa.
Lebanon & Tremont	J. W. Tracy		Pine Grove, Pa.
N. Penn. & B. Brook Divis'n.	E. A. Sweigard		Philadelphia, Pa.
Philadelphia & Baltimore Central	Henry Wood	Henry Wood	Philadelphia, Pa.
Philadelphia & Erie	Wm. A. Baldwin		Williamsport, Pa.
Philadelphia & Erie		Enoch Lewis	Philadelphia, Pa.
Western Division	J. W. Reynolds		Erie, Pa.
Middle Division	E. B. Westfall		Renovo, Pa.
Eastern Division	Thomas Gucker		Williamsport, Pa.
Danv., Haz. & W. Barre Div	Joseph Crawford		Sunbury, Pa.
Philadelphia, Wilmington & Balt.	H. F. Kenney		Philadelphia, Pa.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Philadelphia, Newt'n & New York	L. L. Bush		Philadelphia, Pa.
Piedmont Air-Line	T. M. R. Talcott	R. H. Duesberry	Richmond, Va.
Richmond & Danville Div	W. A. Green		Richmond, Va.
North Carolina Division	A. B. Andrews		Raleigh, N. C.
Pine River Valley & Stevens Pt	N. L. James		Richl'nd Cent., Wis.
Pittsburg & Castle Shannon	A. C. Hays		Pittsburg, Pa.
Pittsburg & Lake Erie	R. W. Jones		Pittsburg, Pa.
Pittsburg Cincinnati & St. Louis	S. M. Felton, Jr.	William Mullins	Pittsburg, Pa.
Pittsburg, Cincinnati & St. Louis	*D. W. Caldwell		Columbus, O.
Pitts., Cin. & St. Louis Div	J. H. Barrett		Pittsburg, Pa.
Col., Cin. & Ind., Cent. Div.	J. Hill		Logansport, Ind.
Col., Cin. & Ind., Cent. Div.	J. F. Miller		Richmond, Ind.
Indianap. & Vincennes Div	E. W. McKenna		Indianapolis, Ind.
Cincin. & Musk. Valley Div	C. C. Waite		Zanesville, O.
Little Miami Div	J. D. Ellison		Cincinnati, O.
Pittsburg, Ft. Wayne & Chicago	*J. D. Layng	William Mullins	Pittsburg, Pa.
Pittsburg, Ft. Wayne & Chicago	†C. E. Gorham		Chicago, Ill.
Eastern Division	George S. Griscom		Pittsburg, Pa.
Western Division	C. D. Gorham		Fort Wayne, Ind.
Pittsburg & Western	G. A. Woerth		Harmony, Pa.
Pittsburg, Titusville & Buffalo	Tho. H. Wilson		Oil City, Pa.
Pittsburg, Titusville & Buffalo		John L. Awl	Pittsburg, Pa.
Pittsburg, Virginia & Charleston	J. M. Byers		Pittsburg, Pa.
Port Dover & Lake Huron	A. B. Atwater		Woodstock, Ont.
Port Royal & Augusta	R. G. Fleming		Port Royal, S. C.
Portland & Ogdensburg	Jonas Hamilton	Jonas Hamilton	Portland, Me.
Portland & Rochester			Portland, Me.
Potomac, Fredericksb'h & Pied't	Charles Kennedy		Fredericksb'h, Va.
Poughkeepsie, Hartford & Boston	J. A. Perkins	A. W. Cable	Poughkeepsie, N. Y.
Prince Edward Island	Alex McNabb	Alex. McNabb	Charlotte't'n, P.E.I.
Prospect Park & Coney Island	R. Schermerhorn		Coney Island, N. Y.
Providence & Springfield	William Tinkham	William Tinkham	Providence, R. I.
Providence & Worcester	W. E. Chamberlain		Providence, R. I.
Providence, Warren & Bristol	Waterman Stone		Providence, R. I.

Q

Quebec, Mont., Ott'a & Occidental	C. A. Scott	Jas. Macpherson	Montreal, Can.
Quebec Central	§A. Steele		Sherbrooke, Can.
Queen Anne & Kent County	P. H. Irwin		Centreville, Md.
Quincy, Missouri & Pacific	F. D. Schermerhorn		Quincy, Ill.

R

Raleigh & Augusta Air-Line	J. C. Winder		Raleigh, N. C.
Raleigh & Gaston	J. C. Winder		Raleigh, N. C.
Rhinebeck & Connecticut	J. H. Jones		Rondout, N. Y.
Richmond, York Riv. & Chesap'ke	H. T. Douglas	B. S. Crouch	Richmond, Va.
Richmond & Danville	(See Piedmont Air-Line).		
Richmond, Frederick'b'g & Potomac	E. T. D. Myers	T. L. Courtney	Richmond, Va.
Richmond & Petersburg	Theo. D. Kline		Richmond, Va.
Rio Grande	H. J. Gomila		Brownsville, Tex.
Rochester & State Line	J. E. Childs	J. E. Childs	Rochester, N. Y.
Rockwood & Tennessee River	H. Clay Evans		Rockwood, Tenn.
Rock Island & Mercer County	*R. R. Cable		Rock Island, Ill.
Rock Island & Peoria	R. R. Cable	R. R. Cable	Rock Island, Ill.
Rome	Eben Hillyer		Rome, Ga.
Rome, Watertown & Ogdensburg	E. A. Van Horne		Watertown, N. Y.
Rome, Watertown & Ogdensburg		G. W. B. Cushing	New York, N. Y.
Rumford & Buckfield	O. Hayford		Canton, Me.

S

Scioto Valley	Joseph Robinson		Columbus, O.
St. Croix & Penobscot	Wallace Haycock		Milltown, Me.
St. Lawrence & Ottawa	*Tho. Reynolds	Tho. Reynolds	Ottawa, Can.
St. Johns	R. McLaughlin		St. Augustine, Fla.
St. Johns & Indian River	W. H. Churchill		Titusville, Fla.
St. John & Maine	H. D. McLoad		St. John, N. B.
St. Joseph & Western	L. D. Tuthill		St. Joseph, Mo.
St. Joseph & Western		A. D. Clarke	Omaha, Neb.
St. Louis, Alton & Terre Haute	Beriah Warren	Beriah Warren	St. Louis, Mo.
St. Louis, Hannibal & Keokuk	W. W. Walker		Hannibal, Mo.
St. Louis, Iron Mountain & South'n	Arthur W. Soper	W. S. Cuddy	St. Louis, Mo.
Texas Division	J. W. Brown		Texarkana, Texas
St. Louis & San Francisco	*C. W. Rogers	C. W. Rogers	St. Louis, Mo.
Kansas Division	W. A. Thoms		Oswego, Kan.
St. Louis, Keokuk & Northwest'n	L. Griffin	John A. Blood	Keokuk, Ia.
St. Louis, Salem & Little Rock	E. B. Sankey		Salem, Mo.
St. Louis, Salem & Little Rock		H. A. Crawford	St. Louis, Mo.
St. Paul & Duluth	Geo. H. Smith		St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	*Jas. J. Hill	J. C. Morrison	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	E. B. Wakeman		St. Paul, Minn.
St. Paul & Sioux City	E. W. Winter		St. Paul, Minn.
St. Paul, Stillwater & Taylor's Falls	A. B. Stickney		St. Paul, Minn.
Sacramento & Placerville	Josiah Johnson		Sacramento, Cal.
Saginaw Valley & St. Louis	N. W. Merrill	N. W. Merrill	Saginaw, Mich.
San Francisco & North Pacific	*A. Hughes	A. Hughes	San Francisco, Cal.
San Francisco & North Pacific	A. A. Bean	P. E. Dougherty	Petaluma, Cal.
San Rafa'l & San Quentin	David Nye		San Rafael, Cal.
Savannah, Florida & Western	*H. S. Haines	W. B. McKee	Savannah, Ga.
Savannah & Charleston	C. S. Gadsden		Charleston, S. C.
Savannah & Memphis	W. S. Greene	W. S. Greene	Opelika, Ala.
Seaboard & Roanoke	J. M. Robinson	J. A. Walton	Baltimore, Md.
Selma & Greensboro	E. W. Rucker	E. W. Rucker	Marion, Ala.
Selma, Rome & Dalton	Norman Webb	Norman Webb	Selma, Ala.
Sheboygan & Fond du Lac	E. J. Cuyler		Fond du Lac, Wis.
Shenango & Allegheny	J. T. Blair		Greenville, Pa.
Shepang	C. H. Platt		Litchfield, Conn.
Sioux City & Pacific	F. C. Hills		Missouri Valley, Ia.
Sioux City & Pacific	*P. E. Hall	P. E. Hall	Cedar Rapids, Ia.
Skaneateles	J. McNamara		Skaneateles, N. Y.
South Carolina	John P. Peck	S. B. Pickens	Charleston, S. C.
Southeastern of Canada	H. A. Alden		Newport, Vt.
Southern Central	Jas. G. Knapp		Auburn, N. Y.
South Mountain	W. H. Woodward		Pine Grove Furnace, Pa.
Southern Pacific	A. C. Bassett	John R. Watson	San Francisco, Cal.
Los Angeles & Yuma Div	§E. E. Hewitt		Los Angeles, Cal.
Tulare Division	E. C. Fellows		Oakland, Cal.
South Pacific Coast	Thomas Carter	DeLancey Stone	San Francisco, Cal.
Southwestern of Georgia	W. G. Raoul		Macon, Ga.
Southwestern of Kentucky	M. Tabler		Harrodsburg, Ky.
Spartanburg, Union & Columbia	Jas. Anderson	Jas. Anderson	Spartanburg, S. C.
Spartanburg & Asheville	Jas. Anderson	Jas Anderson	Spartanburg, S. C.
Springfield, Athol & Northeastern	John W. Phelps		Springfield, Mass.
Springfield & Northwestern	*Geo. N. Black	J. A. Williams	Springfield, Ill.
Springfield Southern	Wm. Thornburg	G. A. Barnes	Springfield, O.
Springfield & Western Missouri	T. F. Oakes		Kansas City, Mo.
Springhill & Parsboro	J. A. Killam		Parsboro, N. S.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Staten Island	John W. Wilber		Tottenville, N. Y.
Sterling Mountain	J. C. Missimer		Sloatsburg, N. Y.
Stonington & Providence	J. R. Gardiner		Providence, R. I.
Stonington & Providence		Giles F. Ward	Stonington, Conn.
Summit Branch	R. C. Peebles		Lykens, Pa.
Summit County	W. M. Riter		Coalville, Utah.
Sussex	E. C. Case	E. C. Case	Newtown, N. J.
Syracuse, Binghamton & N. Y.	W. K. Niver		Syracuse, N. Y.
Syracuse, Binghamton & N. Y.		G. W. B. Cushing	New York, N. Y.
Syracuse, Chenango & New York	A. C. Belden		Syracuse, N. Y.
Syracuse, Geneva & Corning	A. H. Gorton		Corning, N. Y.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
T			
Tennessee & Pacific	J. W. Thomas		Nashville, Tenn.
Terre Haute & Ind'apolis } Van- {	*John E. Simpson		St. Louis, Mo.
Terre Haute & Ind'apolis } dalia }	Joshua Staples		Indianapolis, Ind.
Terre Haute & Ind'apolis } Line. }		C. R. Peddle	Terre Haute, Ind.
Logansport Division			Logansport, Ind.
Terre Haute & Southeastern	George Atherton		Terre Haute, Ind.
Texas & New Orleans	C. A. Burton	P. B. Watson	Houston, Tex.
Texas & Pacific	Geo. Noble	Geo. Noble	Marshall, Tex.
Jefferson Division	J. S. Noble		Texarkana, Tex.
Southern Division	C. Harris		Marshall, Tex.
Texas Western	J. W. Goodwin		Houston, Tex.
Tioga & Elmira State Line	L. H. Shattuck		Blossburg, Pa.
Toledo, Delphos & Burlington	I. H. Burgoon		Delphos, O.
Toledo & Ann Arbor	J. S. Morris		Ann Arbor, Mich.
Toledo, Peoria & Western	W. F. Merrill	W. F. Merrill	Peoria, Ill.
Troy & Boston	E. E. Aldrich	D. Robinson	Troy, N. Y.
Toronto, Grey & Bruce	*Edmund Wragge	W. Watson	Toronto, Can.
Toronto & Nipissing	John Duncan	John Symons	Toronto, Can.
Tuckerton	J. J. Pharo	J. C. Ridgeway	Tuckerton, N. J.
U			
Ulster & Delaware	Geo. Corkendall		Rondout, N. Y.
Union Pacific	*S. H. H. Clarke	A. D. Clark	Omaha, Neb.
Union Pacific	Jas. T. Clarke		Omaha, Neb.
Eastern Division	P. J. Nichols		Omaha, Neb.
Western Division	W. B. Doddridge		Evanston, Wy. T.
Mountain Division	Robert Law		Cheyenne, Wy. T.
Laramie Division	Edw. Dickinson		Laramie, Wy. T.
Colorado Division	A. A. Egbert		Denver, Col.
Union Railway & Transit Co	J. B. Van Dyne	E. J. Williams, Jr.	St. Louis, Mo.
Union R. R. Trans. & S. Yard Co.	*M. A. Downing	**Albert Scott	Indianapolis, Ind.
Utah Central	John Sharp	S. H. Hill	Salt Lake City.
Utah Northern	Geo. W. Thatcher		Logan, Utah.
Utah Western	*W. W. Riter	W. W. Riter	Salt Lake City.
Utica & Black River	J. F. Maynard		Utica, N. Y.
Utica, Ithaca & Elmira	Geo. J. Rice	J. L. Greatsinger	Horse Heads, N. Y.
V			
Vicksburg & Brunswick	W. G. Raoul		Macon, Ga.
Vermont Valley	John Mulligan		Springfield, Mass.
Vicksburg & Meridian	E. F. Raworth	E. F. Raworth	Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	*J. W. Green	J. W. Green	Monroe, La.
Virginia & Truckee	H. M. Yerington	C. P. Mason	Carson, Nev.
W			
Wabash, St. Louis & Pacific	*John C. Gault		St. Louis, Mo.
Eastern Division	R. Andrews		Toledo, O.
Western Division	Thos. McKissock	R. W. Green	St. Louis, Mo.
Illinois Division	H. F. Clark		Springfield, Ill.
Ohio & Indiana Division	K. H. Wade		Fort Wayne, Ind.
St. L., K. C. & N.	W. H. Selby	C. S. Buck	Moberly, Mo.
Wabash, Chester & Western	J. L. Hinkley		Chester, Ill.
Wallkill Valley	J. H. Jones		Rondout, N. Y.
Washington & Ohio	R. H. Havener	Lewis McKenzie	Alexandria, Va.
Wash. City, Va. Mid. & G. South'n	Peyton Randolph		Alexandria, Va.
Waukon & Mississippi	F. O. Wyatt		Dubuque, Ia.
Waynesburg & Washington	Jacob Swart		Waynesburg, Pa.
Welland	William Pay		St. Catherine, Ont.
Westchester & Philadelphia	Henry K. Smith	J. J. Bryant	Philadelphia, Pa.
West Feliciana	J. B. McGehee		Laurel Hill, La.
West Jersey	W. J. Sewell		Camden, N. J.
Western of Alabama	*Cecil Gabbett	Cecil Gabbett	Montgomery, Ala.
Western of North Carolina	L. C. Jones		Fayetteville, N. C.
Western & Atlantic	Wm. McRae	W. R. Webster	Atlanta, Ga.
Western Maryland	*J. M. Hood		Baltimore, Md.
Western North Carolina	J. W. Wilson	J. W. Wilson	Morganton, N. C.
Whitewater	W. W. Worthington		Ft. Wayne, Ind.
Whitby, Port Perry & Lindsay	*Jas. Holden		Whitby, Ont.
Wicomoco & Pocomoke	H. R. Pitts		Berlin, Md.
Williamstown	J. F. Bodine		Williamstown, N.J.
Wilmington, Columbia & Augusta	J. F. Divine	J. F. Divine	Wilmington, N. C.
Wilmington & Northern	J. H. Thompson		Coatesville, Pa.
Wilmington & Weldon	J. F. Divine	J. F. Divine	Wilmington, N. C.
Windsor & Annapolis	*P. Innes		Kentville, N. S.
Wisconsin Central	*F. N. Finney	J. W. Curtiss	Milwaukee, Wis.
Mil. & Eastern Div	C. F. Dutton		Milwaukee, Wis.
So. Mid. & Northern	G. Campbell		Steven's Point, Wis.
Wisconsin Valley	F. O. Wyatt		Tomah, Wis.
Woodstock	J. G. Porter		Woodstock, Vt.
Worcester & Nashua	C. S. Turner	C. S. Turner	Worcester, Mass.
Worcester & Shrewsbury	J. F. Bigelow		Worcester, Mass.
Worcester & Somerset	F. J. Faulder		Philadelphia, Pa.
Y			
Youghiogheny	Wm. Wilson		Irwin's, Pa.

LIST OF NAMES OF PARTS OF BELL-CORD FIXTURES WHICH ARE DESIGNATED BY THE NUMBERS IN FIGS. 450-465.

1. *Bell-cord Pulley.*
2. *Bell-cord Strap.*
3. *Bell-cord Strap-hanger Bracket.*
4. *Bell-cord Guide.*

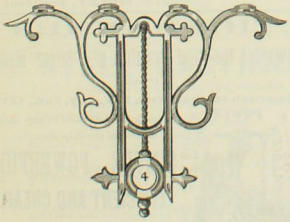

Fig. 450.
BELL-CORD FIXED-HANGER.

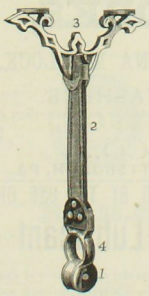

Fig. 451.
BELL-CORD STRAP-HANGER.

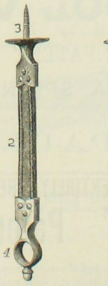

Fig. 452.
BELL-CORD STRAP-HANGER.

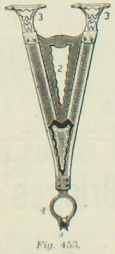

Fig. 453.
BELL-CORD DOUBLE STRAP-HANGER.

Fig. 454.
BELL-CORD BUSHING.

Fig. 455.
BELL-CORD BUSHING, *with Pulley.*

Fig. 456.
BELL-CORD BEVELED-BUSHING.

Fig. 457.
BELL-CORD GUIDE, *with Flange.*

Fig. 458.
BELL-CORD GUIDE, *with Flange and Pulley.*

Fig. 459.
BELL-CORD GUIDE, *with Flange and Side-pulley.*